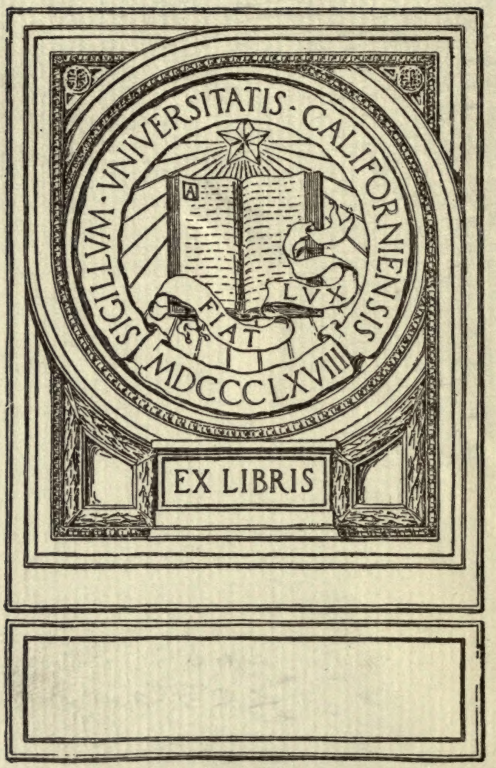
UNITY IN NATURE

AN ANALOGY BETWEEN

MUSIC AND LIFE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See pp. 81 and 87.

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AN ANALOGY BETWEEN

MUSIC AND LIFE

LICK OBSERVATORY
UNIVERSITY
JUL 17 1918
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BY

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PREFACE.

Being an Engineer by choice and profession, it seemed but natural that the analogy with which these pages deal should, from the very first, have exerted a powerful fascination over me; for Engineers lean almost entirely on analogy for their inspirations and progresses. In this respect our professions differ from the less practical but more logical ones, whose members are satisfied with the finality which is associated with what they accept as proofs. These, although they determine Judges, juries and the public, even in matters of Life and Death, or Peace and War, are only too often based on false or insufficient evidence and on sophistical arguments. On the other hand, Engineers and in fact all Scientists abhor every suggestion of finality, for that is a stumbling block to improvement and progress. They feel that, from first to last, each experiment is but the analogue of the next one, that the inventor's sketch is but the analogue of the finished machine and that there is no end to possible researches and improvements. To this tendency of Engineers, to lean on analogy, might be attributed the slowness of mechanical progress, but it is far more correct to say that practical advances have generally been hampered for want, at the time, of suitable materials. Seeing that these never affect the first flights even of inventive ideas, I need hardly have felt surprised at the ease and rapidity with which the present analogy led me along untrodden paths to points of view which do not seem to have revealed themselves to Logicians, writers who have to limit their thoughts and

ideas to the words with which their languages have provided them. Looking back from one of these points of view, the fact stood out with glaring distinctness, that the existing philosophical systems have been evolved during tens of centuries, in which the great principle of the Indestructibility of Matter had not been established and that of the Conservation of Energy had not even been suggested; two principles on which every modern science is now securely resting. Through floating mists glimpses could also be caught of painstaking thinkers of the past, who vaguely conscious of the overshadowing presence of these great truths, to which they could not lift their eyes, gave expression to their feelings by dividing this world, sometimes into superior and inferior realms, sometimes into material and immaterial parts and sometimes into good and bad camps. Turning towards the future the view is less clear, for no one can tell whether the fuller exploitation of the scientific discoveries of the last century will satisfy our craving for knowledge as to what we are, a craving which seems to be the child of a longing for confirmation of an inner feeling that, we are one with Nature, in other words, that there is a real "UNITY IN NATURE."

C. E. S.

WEST DIDSBURY,
October, 1911.

CONTENTS.

	PAGE
Introduction	1
Flatland	12
Nature of Music	19
Laws: Natural and Artificial	34
The Essence of Music and of Life	62
Matter	69
Energy:—	93
Heat	98
Electrical	100
Chemical	102
Organic or Cell	111
Geological Records	121
Palæontological Tables	154
Evolution	160
Nerve Energy	171
Ideas and Idols	189
The Fourth Dimension	208
The Creator and His Work	218
Perfect Music	225
Perfect Life and Human Happiness	229
Ethics	247
Urbanism and Ruralism	271
Sexual Ethics	294
States	332
Education or State Thinking	345
Political Economy	396
State Harmony	422

PAGE

Reserve Power of State - - - - - - - 472
State Incongruities and Discords:— - - - - 489
Legislation - - - - - - - - - 492
Representation - - - - - - - - 506
Constitutions - - - - - - - - 521
Justice - - - - - - - - - 526
Administration - - - - - - - - 534
Taxation - - - - - - - - - 536
Property - - - - - - - - - 547
Marriages - - - - - - - - - 554
The Drink Question - - - - - - - 560
Education - - - - - - - - - 564
The Press - - - - - - - - - 571
War - - - - - - - - - - 573
Contraband of War - - - - - - - 584
Communism - - - - - - - - - 587

INTRODUCTION.

In Dreamland the process of finding a suitable beginning to a sudden event is a very simple matter. A noise or an external or internal disturbance creates a shock which is magnified into a catastrophe, perhaps into a fall from a cliff, then on awakening or perhaps even while sleeping, the intellect manufactures a whole string of more or less plausible preceding events. It is different in literature. A leading idea grows out of past events and thoughts, and while it is being developed and expanded into other and newer ideas, its origins are at times lost sight of, and if, on rediscovery, they should be placed in the van of the matured subject, a prominence is given to them which they do not deserve. The present subject has been no exception to this rule with the result that after completion, the temptation was experienced not only of discarding the ladder by which certain points of view had been reached, but even of recasting the whole framework and of discussing philosophical subjects on philosophical lines. But then again it was felt that to marshal arguments for and against particular ideas, demanded painstaking and lengthy reviews of all that has been preserved of other peoples' thoughts, a process which, if extended to all the subjects touched upon in these pages, would become interminable and confusing, nor would this be a satisfactory process unless it led to some definite pronouncement in the finish, an impossibility with a subject which is connected with so much that may for ever remain unknowable. In fact when the simple question is asked: "What is it that one really knows?" the answer is essentially that one knows nothing. It may be said that there is a definite feeling as to the nature of space, time, matter and energy, and

their subdivisions and interactions are called sciences, but even they do not help to a real knowledge of what things actually are, they do not define each other. Hours are not expressed in terms of yards, nor gallons in terms of pounds.

In discussing an unknowable subject like life, it seemed that the best that could at present be done would be to try and impart a correct feeling about its nature so as to place it on the same level as time, space, matter and energy. This would have to be not a philosophical but an artistic process, one which is being constantly carried out in all works of art. Music deals with time, and sculpture and painting with space. It is true that all works of art are intended to represent life, but each statue, each picture, each play or book deals with only one form of life, whereas here the desire has been to bring within the compass of human contemplation the all-embracing life of the universe. Such a complex cannot, of course, be represented on a single canvas and a multitude of pictures would only obscure the view, nor can it be expressed by a single philosophical pronouncement. A semi-artistic and semi-philosophical process, one which led to the views contained in these pages, has therefore been adopted of using Music as an allegory of Life. Schopenhauer's idea, that Music is quite as independent a world as the physical one, has been exploited to its fullest extent, and step by step the reader will be asked to transplant himself alternately into the world of Music and into the physical world, in the hope that he will thereby gain a better feeling as to the real nature of both.

Allegory seems to be the best means for obtaining, if not a better insight into, at any rate a more sympathetic feeling with a set of very complicated subjects. It has certainly in the course of this work helped to reach many new points of view, and it has only the disadvantage of not being as exact as mathematical reasonings are supposed to be, nor as attractive as artistic works of fiction.

On the other hand it must not be forgotten that fables, parables and allegories are the implements which are used not only for the education of children but also of nations.

Before outlining the path which will here be followed it seems desirable to make a few remarks about the unknowable and about the difference in the methods employed by art and philosophy, and their working.

To answer the question " What is it that we know? " is about as difficult as to explain "What is truth?" Kant and Schopenhauer deny even existence, to them all is imagination, and space and time are no realities but mere functions. Yet each living creature is conscious that it exists, appreciates the space in which it moves and the change of time. Whether even human beings really know what these things are, does not matter, knowledge may be imperfect as compared with superknowledge of metaphysicians, but the word knowledge has been adopted by mankind for expressing a certain capability and there is no need to change its meaning. To know what space is, means not only to have a vague notion about its existence but it also means that it can be dealt with, that it can be subdivided, measured and correlated. This is the science of geometry. Geometry does not profess to say whether space is a reality or merely a function, nor does it explain space in terms of time. It merely discusses the inter-relation of subdivisions of space. What Locke, Kant and Schopenhauer meant by their use of the word knowledge is a sort of superknowledge, which would be as difficult to define as the objects about which superknowledge is being sought. Time also is well understood by reasoning beings. Its subdivision and correlation is the science of numbers. Algebra is applied to both sciences and is merely an instrument for recording and conveying thoughts about time and space, just as speech, writing and drawing are instruments for conveying ideas. But Algebra does not unite time and space, nor does it enable the one set of dimensions to be expressed in terms of the other. Energy

can be converted into heat or into electricity because the three are one and the same thing, but time cannot be converted into space nor measured in space units. A square yard of hours and a week of cubic inches are equally absurd expressions. The combination of space and time gives rise to the ideas of velocity, acceleration, etc., which are perfectly understandable, but it does not help to explain either time or space.

Although, therefore, one knows, in the ordinary sense of the word, what time is, and what space is, one has not the superknowledge which might permit of time being explained in terms of space and *vice versa*. The ancient Greeks knew this and expressed themselves by saying that only like can measure like, space measures space, weight measures weight, force measures force, etc. Matter is another something which is unknowable, though chapters in physics and the entire science of chemistry are occupied with this subject. Matter exists in space, movements of material objects, chemical changes are carried out during definite periods of time and a full knowledge of matter demands a knowledge of the correlation of time and space with matter, but matter cannot be converted into time, nor into space, nor can it be expressed in their terms. Such expressions as a cubic yard of pounds, or a hundredweight of hours are quite meaningless. A cubic foot of water is a different term altogether, it cuts off a certain quantity of matter about which one has the knowledge that it weighs so many pounds and that it has various properties and qualities.

Very similar remarks apply to energy, the fourth constituent of the Universe; like time, space and matter it is indestructible. The physical sciences impart a very full knowledge as to what it is, but it cannot be expressed in terms either of time, space or matter; here too therefore the superknowledge hoped for by some metaphysicians is an impossibility, and all that can be done by philosophy is to study changes, subdivisions and correlations, while

art has to content itself with portraying these subdivisions in such a way as to impart a more or less correct feeling about them.

Art and Philosophy are two luxuries which human beings indulge in, apparently with a semi-conscious feeling that they bring them nearer to the secrets of the Universe, or that they may be capable of revealing the truth about a something which can be seen, heard, felt, tasted, smelt, about a something which is called Nature. A name has been given to this something, yes many names, but humanity has no superknowledge as to what it is. Partly perhaps because of this deficiency in our knowledge, partly perhaps because human beings are a part of this something, and because the highest striving of this something is towards self-consciousness, they have a constant longing to know what it is and they are also constantly attracted by its manifestations. Art in a way satisfies this craving by portraying nature, by presenting its essence. That unquestionably is the reason why art does not improve by being brought into contact with nature; a picture gains by being hung on a bare wall but loses if surrounded by living foliage. In our towns nature's green trees and the soft meadows have been replaced by walls and pavements, so that even a prop or a buttress pleases us because it conveys the idea of a force of nature which is quite absent from a flat surface. Even a hole in a wall would be welcome because it too gives an idea of thickness and of strength. Philosophy on the other hand aims at discovering what nature is. Art appeals to the feelings and therefore expressions about works of art are of a feeling nature, such as graceful, beautiful, grand and horrible. Philosophy appeals to the intellect and one admires those of its votaries whose brains have discovered gravity, heat, electricity and other forces of nature, for they have brought us a few steps nearer to a true understanding of the world.

Philosophy professes to proceed step by step and clings

to what it calls facts, like a mountaineer to his rocks, whereas Art flies from peak to peak, ignores the rocks of which they are built up and makes one feel how vast and grand, how beautiful and deep is the world. Thus Philosophy is able to explain why stones of certain shapes can be placed together in such a way as to support each other and form an arch, their strength and weight can be estimated, so can the force of gravity and the lines of thrust, but even to-day the philosopher cannot say what gravity is, nor force, nor weight, nor strength. The artistic designer of an arch does not attempt to explain these things, he feels their essence and, if he has put this feeling into his design, it becomes a work of art. He does more than this, he makes artists of others by teaching them to feel what he felt, the very essence of the primitive forces. He does this through the feelings which a contemplation of the graceful lines of his work engenders.

In one sense architecture is the simplest of arts; it aims no higher than to awaken sympathy with nature's primitive forces. In painting and sculpture art aims at familiarising us with other and more complicated powers. Animal strength, agility and beauty, when represented by a true sculptor, are far more than mere imitations, their essence has made itself felt, though the substance is but stone which possesses neither animal powers nor agility. Pain, fear, ferocity, hate and the more tender passions are less easily infused into cold marble, colour is wanted; "Soft eyes spake love to eyes that spake again" . . . is an impossible subject for bronze. The artist's brush is called in to depict what human eyes have perhaps not seen, but what human beings feel and what the artist must have felt before he could portray it.

Again a painting can render only a single feeling, but a change, as from fear to triumph, from joy to sorrow is beyond its reach. This is the domain of the poet, the actor or orator, and it is here that the contrast between the artist and the philosopher, or rather between their

methods, is most marked. The poet feels the influence of forces of nature, including human passion; he may have experienced the irresistible power of love and may cry out "I list not, I care not, if guilt's in thy heart, I know that I love thee whatever thou art." He thus conveys the feeling that love may drive men to almost any deed. Philosophers offer little help; they cannot even explain why love is powerful, nor what it is, whereas the poet feels, and makes others feel what it is and makes poets of them. That is the reason why little thought is given to the means he employs, "Rhyme is not reason," but to many it appeals more strongly than any laboured arguments.

In searching for the true nature of music, a subject which will here be attempted, one should therefore not listen only to what the philosopher has to say about it but also to the artist's production. Both will find it difficult to give a straightforward reply. The one may attempt an answer to the effect that music is the harmony of vibrations, but that does not give the essence of what music is. One naturally turns to the musical artist. He may say that he cannot tell what music is, but that he will perform his favourite piece. It may excite the audience to the point of dancing, it may lull it to sleep, it may make some weep or otherwise affect the feelings, and when he has done and proudly says "That is music," a momentary feeling that one knows what it is may creep over one. That is perhaps what Schopenhauer meant (Die Welt als Wille und Vorstellung, vol. i, § 52, vol. ii, chapter 39). Schopenhauer's remarks about music are said to have inspired Wagner; briefly stated, they amount to this, that music is a parallelism of life and not its copy. He likens the bass with its slow and restricted movements to the primitive but powerful forces of nature which guide the stars, produce earthquakes, storms, fire, heat and light. The tenor and alto, according to his view, run parallel with the organic kingdoms of plants and animals, while

the soprano is likened to the actions of human beings. Schopenhauer seems to have been the first to point out this parallelism in words, but every song, every opera is an indication that some sort of a parallelism exists between music and the actions and sentiments of human beings.

The word parallelism is expressive in more senses than one; not only does it imply that there is an active life in the musical spheres, similar to that in this world, but it also conveys the impression that life and music are not copies of each other, that they may run side by side without ever actually meeting. The works of all other arts are linked to us by some association of a material kind, and are copies of realities, but music differs from them all, its only point of contact being, that while it consists of frequent changes of vibrations, one of our senses, hearing, is specially adapted for rapidly following these changes and harmonising them. When this connecting link is severed by deafness, as it was with Beethoven, the music which is still felt must, more than ever, seem like an independent world, a sphere into which composers have the *entrée;* it is, therefore, to them that one looks for information as to what that world is.

There is a strong feeling that there may be other worlds like music for which none of our senses have become adapted, and innumerable have been the efforts to make tangible what no man has seen or heard. Of these attempts the fairy tales, the legends of spirits and of gods are the best known examples; they aim at giving shape to feelings about possible worlds which are beyond the reach of human senses. Visits are paid to the planets, distant stars, to heavenly regions, the Styx and Hades, or inhabitants of these distant or imaginary worlds visit this earth and leave their notebooks behind them, the object in all these narratives being to transfer human beings to some outside standpoint from which we can see ourselves and this world as others might see us. It is not a philosophical process but an artistic one, things are not explained but

are placed in relief for contemplation. The happenings in one world, allegorically explain those in the other world. This is the path which will be trodden in these pages, positions will several times be changed from the physical world to the musical world, and back again. From the one standpoint music will be scanned, and from the other this world and its life will be surveyed.

The first task which has to be undertaken is to convey the idea that music is an independent world, but so difficult even conversationally has this task been found, that the assistance was called in of a sketch by an author calling himself "A Square," who tried to explain the nature of an independent world called "Flatland," to which subject one chapter in the present work is devoted. Then follows a chapter entitled "Music," in which an attempt is made to impart the feeling that music, as distinct from musical pieces, is without beginnings and without endings, and that in this respect at least it is similar to our world. The next chapter on "Laws," also aims at demonstrating the similarity and the independence of the two worlds by showing that they are both controlled by unalterable laws of nature.

These chapters may be looked upon as introductions, and now the process of contemplating each world from outside points of view is indulged in several times, the first question asked being: "What is the 'Essence of Life and of Music?'" The answer is that both are essentially dualisms, and then dealing lightly with the musical world six rather substantial chapters follow on the dualism of the physical world, on "Matter and Energy." The next contemplations from the musical and physical points of view lead to the questions as to what is the inter-relation between a composer and his musical pieces and that of a Creator and His Creation. As the answer must necessarily suggest the possibility of the existence of a spiritual world which is as superior as regards dimensions, as ours is to the world of music the above subjects are preceded by a

chapter on the "Fourth Dimension," in which it is suggested that the abode of a Creator is not likely to be in a world which has merely one more dimension than ours. The suggestion is there thrown out that a study of electricity does at least suggest the existence of other worlds.

Once more the process of changing standpoints is resorted to, and the questions are asked: "What is 'Perfect Music?'" and "What is happiness or 'Perfect Life?'" Thus by an unfrequented but perfectly straightforward and easily negotiable path, the same point of view is reached from which philosophers of all ages have tried to survey the actions of human beings. The outlook, screened as it always has been by preconceived or nursery notions, is but a limited one, and although there was serious temptation when dealing with "Ethics" to define right and wrong, good and bad, the temptation to sit in judgment has been resisted and attention has been centred mainly on a true understanding of what humanity means by the expressions Immorality and Crime. This method of dealing with ethics necessitated the interpolation of a chapter on "Urbanism," in which town and country life are contrasted.

It was hoped that these chapters could have concluded the work, but even these introductory remarks must lead to a feeling that, in searching for what the general public mean by immorality and crime, the question of state immorality and state crime looms darkly ahead, and it seemed as if the subject would be incomplete unless "State Education," "State Harmonies" and "State Incongruities" were also discussed. It will of course be understood that these chapters, even more so than the previous ones, could not, without becoming meaningless to most people, refrain from touching on modern topics, and quite unintentionally an undesirable flavour of onesidedness will have made its appearance. Several attempts which were made to neutralize this effect had to be given up, for they merely resulted in creating an impression of vague-

ness and vacillation. There has certainly been no intention to discuss politics, unless of course political influence be interpreted to mean the pointing out of state blemishes in the hope that they may be removed and that conflicting tendencies may be harmonised.

Nevertheless it was not for these objects that this work was written. It was, as already stated, prompted by Schopenhauer's suggestion of a parallelism of music and life, and gradually during the progress of this work as this parallelism was being traced more thoroughly than he had done, the conviction grew that indestructible Energy, a comparatively recent discovery, in all its numerous manifestations as Life, deserved far more attention than has yet been accorded to it by metaphysicians, and that possibly a better use than has been customary might now be made of the great advantage possessed by human beings of being able to contemplate all things, and that this might lead to a clearer understanding of what perfect life is or what it should be.

FLATLAND.

As it is intended to deal with music as if it were an independent world, a world outside of the universe, it is essential to grasp the idea of an outside world, and at first one turns almost naturally to the world of spirits, but theirs is an unknown one, believed to be governed by laws which are a strange and arbitrary mixture of natural and supernatural ones. It therefore seemed desirable to create a new world, which should be possible by imagining some of the great forces of nature, as for instance heat and light, to have been removed. Then the surface of the earth would be absolutely lifeless, no fluids could exist as such, because of the cold and there would be no bright sun nor stars. The only signs of life would be the rotation and revolution of black planets and black and cold suns. Life would be a problem of circles. Such a world would be unsuitable for the present purpose. Let gravity and attraction be removed, then at once all the suns and stars would fall to pieces, would become dust or vapour, life would again be impossible, there would even be no motion in the universe; it would be a lifeless dust or gas.

These attempts at creating new worlds by removing one of the essentials of this one are evidently failures, but fortunately mathematicians, by mixing up geometry and logic, have been able to conceive the idea of a world with four dimensions; a world which "A Square," the author of "Flatland," sets himself to demonstrate. He tries to show that another world, or a system of a world could be conceived, in which space, instead of having only the three dimensions: length, breadth and depth or height, has four. This, it is shown, would be a somewhat unstable

and unsatisfactory world in which its objects could have no inside and no outside, in which hollow spheres, for instance indiarubber balls, or their equivalents, could be turned inside out without having to be cut, in which oranges might find themselves with their pips sometimes inside, sometimes outside, in which single knots could be tied in endless ropes, in which objects could disappear from one point and appear in another, about which world it is even hinted that it is the world of ghosts and spirits. Whether any sphere, rope or living ghost can possibly exist in a space having four dimensions is a matter about which "A Square" does not trouble himself; he merely wishes mankind to grasp the possibility of the existence of a world with four dimensions. To do this "A Square" adopts the plan of first of all inventing a much simpler world than this physical one with its three dimensions, a world with only two dimensions: length and breadth. He calls it "Flatland," and then shows how difficult, not to say impossible, it would be for the inhabitants of Flatland to grasp the idea of depth or height, a dimension of which we know that it has an actual existence. From this difficulty he argues that it is equally difficult, not to say impossible, for individuals like ourselves who live in a world of three dimensions to grasp the idea of a fourth one.

It is not desirable to follow "A Square" in his amusing and instructive efforts to make one feel the reality of his imaginary world, especially as it is rather mathematical in its details, but an effort will be made to reproduce his world on a more physical basis. Let there be an absolutely calm pond of stagnant inky water. Assume it to be covered with a dense black fog and that on this black water a small quantity of the clearest mineral oil is poured. It will at once spread itself out over the surface and thus constitute a transparent sheet, a flatland, in which seeing along the surface would be quite possible. The inhabitants are Flatlanders who must be lighter

than muddy water and heavier than fog. Each Flatlander must be surrounded on his or her circumference by a nervous system with which other objects in transparent Flatland can be observed. If the fog were cleared away, these Flatlanders, viewed from above, would look like leaves or bits of paper, floating on inky water. They are supposed to be capable of propelling themselves and of seeing each other through the thin covering film of oil and of being able to communicate with each other, but they must be supposed to be incapable of moving up or down, or of seeing or hearing what is above them or below. Even if they had been created with nerves extending over their flat sides, as animals have nerves not only on their outsides but also in their insides, the water and the fog would still prevent their utilising them and training them to interpret sensations which might reach them from above or below. Should a bubble rise from below and lift up the centre of a Flatlander so that this part would be in the higher world, in Fogland, then no doubt he would feel sensations which human beings feel when they think themselves ill. He might call in a Flatland doctor, who, guided by previous experiences, might administer a medicine which, without his knowing the exact action, effects a cure by eating a small hole in the centre of the Flatlander's flat body and thus letting the gas escape upwards, or a natural cure may be effected by the sideways escape of the bubble. In any case the patient would have no conception of the actual cause of his trouble; he would be incapable of conceiving the spherical shape of a bubble, just as human beings are generally quite unable to locate an internal trouble; they do not know which tooth is aching, they complain of headaches when bowels or eyes are out of order, and even feel pains in the tips of amputated limbs.

Let it be assumed that these Flatlanders have attained a high state of civilisation, that they can even philosophise about much that occurs in Flatland. They may have

discovered the laws that objects in Flatland can alter their shapes, which we should call circumferences, but that their sizes, which we should call superficial areas, cannot alter. In Flatland a square inch would remain a square inch for ever. It might change to two inches long and half an inch broad or ten inches long and one-tenth inch broad, but its size or area would always be one square inch. This law would be similar to the one which has been established in the physical world, that matter is indestructible, that its shape can be altered but not its weight. It has also been established that energy may be converted into numerous conditions but that it, too, is indestructible, and its amount never changes.

Let it now be supposed that some object, say a piece of wood, is being slowly lowered out of the fog through Flatland into the muddy water below, and suppose that a Flatlander scientist is near at hand to observe this proceeding. He would be seeing what here would be called a ghost. A something real appears where there was nothing before. Imagine his consternation on seeing an object appear where there was none, growing in size and altering its shape. Suppose also that it should accidentally catch one of the Flatlanders, drag him down and therefore more than kill him by actually carrying his body out of his world, out of Flatland. What would be said? What should we say if one of us vanished? Bystanders would be able to swear to what they had seen, others would probably not believe them, and if a sufficiently powerful caste existed in Flatland to whose well-being it might seem essential that every Flatlander should truly and faithfully believe in the indestructibility of Flatland objects, then no doubt, they would see to it that the unfortunate observer of an uncanny apparition would be put under lock and key or otherwise made harmless. Such a case is not mentioned by "A Square," but he deals with a similar possibility and allows one of the Flatland philosophers to grasp the true explanation, viz., that besides

length and breadth, which are the only dimensions in Flatland, there may be a third dimension, which here is called either height or depth. He then lets his Flatland philosopher try to explain this view to his people, but this is impossible, he has not even got the necessary word "height" in his language to do this properly, so that his task is as difficult as that of explaining a fourth dimension to us.

Suppose Flatlanders to have nerves throughout their bodies, but that only the circumferential ones are in use and cultivated, then it would at any rate not be impossible for their body nerves or, as we should call them, their surface nerves, occasionally to become sensitive in cases of injury or illness. Sound, which travels in the fog, but not in the Flatland film of oil, might now be detected by such a morbidly sensitive Flatlander. This would be a case of Flatland clairvoyance. Then again each Flatlander is really not a surface but an object, and although he has been assumed to be very thin, there is no difficulty in supposing him to be a really bulky object such as a log of wood, a floating branch or tree, or even an iceberg, provided of course that in each object the sensitive nerves are distributed only along the oil film on the water level, or perhaps that it is only the presence of this thin film of oil which allows the nerves to act. If then two Flatlanders who in this world would be recognised as icebergs, perceived each other through the medium of their Flatland film of transparent oil, and if they wished to make each other's acquaintance by contact, they would find this to be impossible, for their under water portions, of which Flatlanders, being unable to grasp the idea of depth, have no conception, would knock against each other long before the water level circumference could touch. Similar cases are noticed in this world. Two people, who at a distance attract each other, possibly till they marry, afterwards sometimes evince an inexplicable antipathy. In such cases, "A Square" would probably suggest that the fourth dimen-

sions of these people are more bulky than their real dimensions, and that it is their fourth dimension bulk which keeps them apart. People who can be approached from only one or two sides, who have to be flattered or loved or bribed, would in Flatland be represented by weighted poles, floating about in a slanting position instead of upright. Two such slanting poles would be kept apart in Flatland, that is at the water level, if their upper ends, which project into the fog, or their lower ends which are submerged in mud were to touch; they can meet, but only on two definite sides, cupidity perhaps or love, whereas intellectually they jar on each other.

It may also be assumed that some Flatlanders are constituted like water lilies, with stems and roots, the floating leaves of which the real Flatlanders have of course no conception, for these reach deep down below the transparent film into the muddy water and into the earth. Several of these Flatlanders, whom one recognises as leaves or flowers, are, without their knowing it, connected with each other by their stems. Then if one Flatlander (a leaf) moves, another has to move too, when disease or death seizes one, the other also languishes, but not necessarily always the nearest one. Human beings can explain these matters because they see the stems and common roots, but not the Flatlanders. Yet similar cases are sometimes recorded in our world and are perhaps best exemplified in the legend of the Corsican brothers, who, though separated by space, lived a common life. The connecting link would be the fourth dimension. This might explain telepathy.

It is not here intended to suggest the possibility of a fourth dimension; the above cases are merely introduced for the purpose of illustrating the difficulties under which Flatlanders would labour if they tried to explain strange phenomena, which if their's is part of a three-dimensioned world might from time to time be noticed by them. These speculations are not contained in "Flatland," in fact, as

already stated, that story is very mathematical, but it does finally mention that the Flatland philosopher tries to explain the third dimension by the method adopted by "A Square" with regard to the fourth dimension. He conjures up a new universe of one dimension less than his world, a Line-world in which the individuals can move and feel only along one straight line, they are supposed to communicate with each other by chirping. Here at last is a suggestion which is worth considering. Is not that one dimension world the world of Music? Music has no length, no breadth, no depth, it lives only in time, or as mathematicians would say, it has only one dimension. The imaginary Line-land of a Flatland philosopher is apparently music pure and simple. His views on Line-land are interesting from a mathematical point of view, but being exceedingly limited and difficult to understand, and at best only imaginary, it is in every respect more desirable to leave Line-land, Flatland and Four dimensions and to turn to a more real world—the world of music.

THE NATURE OF MUSIC.

The universe in which music exists is time, and whereas ours is relatively a double universe, consisting of infinite space and everlasting time, music is a single world independent of space. Subdivisions of time chronicle the events in the physical world as also the sequences of chords and notes in the musical world. Time is therefore common both to the material and to the musical world, and the very natural question arises: Do events in the musical world follow each other with the same certainty as here? Does the law that effect follows cause hold good with music? And if so, is the chain of chords and notes infinite in the same way as the chain of events, of causes and effects is infinite in this world? In other words is music without beginning or ending? The ready answer, the popular answer, is that every piece of music has a beginning and ending, but composers' experiences point to another conclusion, for having hit on a theme they at once find difficulty in dealing with it. They have to prepare an introduction which in turn may want another introduction, and when that matter is settled, they have still greater difficulties in bringing the piece to an end. In fact there is such a sameness about musical endings: just a few conventional chords and then silence, that as regards endings at least there is no need to ask composers, one feels with them that if music were left to itself it would go on for ever, just as a play or novel would have to go on for ever if the public were not agreed that it has to end with the death or the marriage of the hero or heroine. Is it not possible that a musical piece, as the name implies, is but a piece cut out of a musical whole, just as novels,

plays and even history are but portions of a never ending life? Authors are certainly put to no end of trouble as regards finding fitting beginnings and endings for their works. It is so difficult to take a small part from a whole and to shape its endings so that they shall produce a harmonious effect. A tree with its branches, twigs and leaves is a complete object and generally a beautiful one, but cut it down and saw the trunk into short logs, in the same way that a historical writer cuts out a period of the life of a nation or of a man, then each log is of the same substance as the tree, but it has two flat ends which indicate that it was part of something greater. If the ends are now carved away till they are beautiful it will be found that the bark which beautified the tree is now an eyesore. On removing it the trunk and ends do not harmonise, and the whole block has to be carved into something shapely—a statue, an idol. The wood has been idealised. One may still recall that the piece is but a portion of the whole, of a tree, but one would not even be sure which end was top or which was bottom.

The same transformation happens in the case of novels, plays and historical sketches. In many novels the introduction consists of a description of the lastingly inanimate, of a field, forest or room, then an animal or human being is introduced and the plot grows. A start is there made from a resting point, from monotonously routine events. Turning to the stage, more particularly to some of Shakespeare's plays, it will be found that some of the first actions are such as might have been going on for a long time. Nothing could well be more monotonous than the weary tramp of the sentry in "Hamlet." "Romeo and Juliet" commences with a foolish talk amongst some lazy servants who are strolling about on a hot day. Antonio, in the "Merchant of Venice," starts by saying what a man in his condition would doubtless have said many times before. He feels sad and restless. The play, "Julius Cæsar," commences

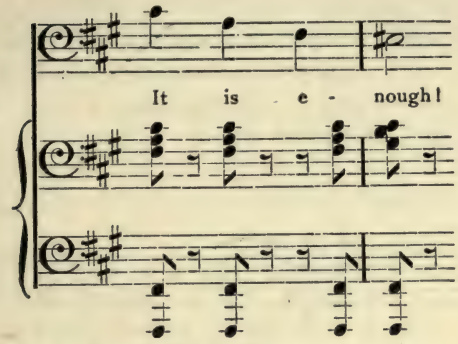
with an argument from a tribune, who seems to have been arguing as long as people can remember. Shakespeare's introductions to his historical plays are different; he evidently assumes that the preceding history is known, and he plunges straight into the essence of the plot. Introductions have also been omitted in those cases where an early revelation of the plot can be relied upon to carry the audience from everyday thoughts to the events which are now to be placed before them. Troilus mentions at once that he is in love, and with the opening words of Othello one hears that there is hate between him and Iago. Racine's Tartuffe opens in the same way and has the additional feature of introducing all but one of the characters in the first few minutes.

The same remarks apply to the endings, but here the devices are fewer, cruder or entirely absent. The mere fact that it is time for the audience to go home is a sufficient excuse for hurrying the play to an end; a climax is a favourable point at which to lower the curtain. Generally, however, plays end when the plot is exhausted, when the principal character dies or marries. The audience departs but not with a feeling that the real end has come. Hamlet, Laertes, Ophelia, Polonius, the King, the Queen all die, but Fortinbras' retreating drums are heard as he marches away to seize the vacant throne, Romeo and Juliet die, but the parting speech of the weak-kneed Prince foretells that he will not be able to lay the strife between the two contending houses. Thus every play, every novel, leaves us with a feeling that the events with which it deals are but portions cut out of the infinite sequence of events.

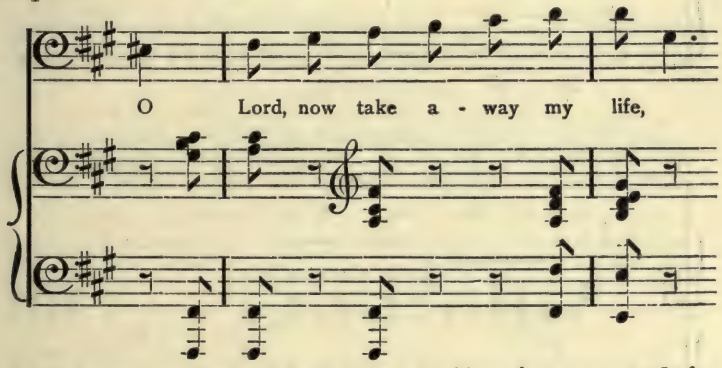
It is the same with pieces of music. Their endings have certainly a sameness and an artificial ring about them which leave no doubt that the composer has strained a point to reach the end. Artificially the rhythm and the melody come to a pause together and this being a convenient point for stopping a stop is made.

The beginnings are more varied. There is really no musical reason why a first note should ever be sounded; musically it should grow out of previous notes, therefore, as in certain popular patrols, Hamlet's monotonous sentry tramp is imitated, by sounding a faint distant throbbing, which develops into a more complicated rhythm and as this grows louder it is accompanied by the melody. During this period, the audience, which at first was thinking and talking of other matters, catches the seemingly distant strain and is all attention when the melody is fully reached. Many pieces, as for instance Beethoven's symphony in C minor, commence with the full chords of the main subject, the key being also definitely fixed at the start, a similar beginning to that of Racine's Tartuffe. The beginnings of the succeeding parts of a symphony are similarly abrupt, but that is more natural, for the preceding parts have led up to these.

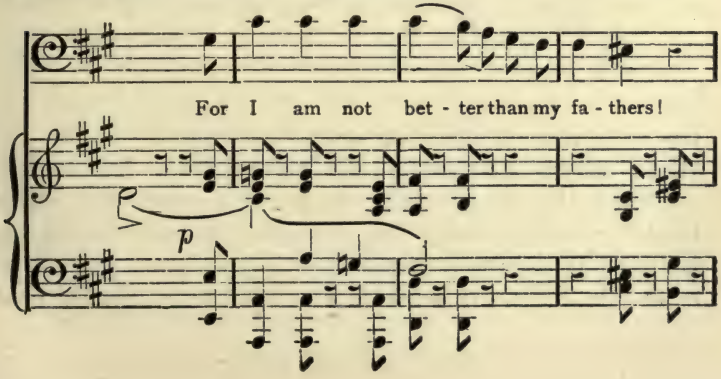
The preceding remarks are likely to be objected to by musical critics and will not be very clear to the mere lovers of music who on the spur of the moment may not be able to conjure up the melodies referred to. One example has therefore been introduced here and because of its popularity it should appeal to all. Then also because of the parallelism of the conditions portrayed by the words and the musical situations being in harmony, this song affords an illustration that both poetical and musical beginnings and endings are not real ones, and a better understanding will it is hoped be gained of what is meant by a parallelism of music and words. The song is that of Elijah in the desert which is so well known that the notes might have been omitted. Its opening is like that of "Hamlet": silence and monotony; one hears the prophet's dreary moan. His past history has been an exciting one, but for the time being the man of action is wearying in the boundless, the silent, the parched desert. He is silent while the music has sunk to a mere breath. One sigh escapes him:—



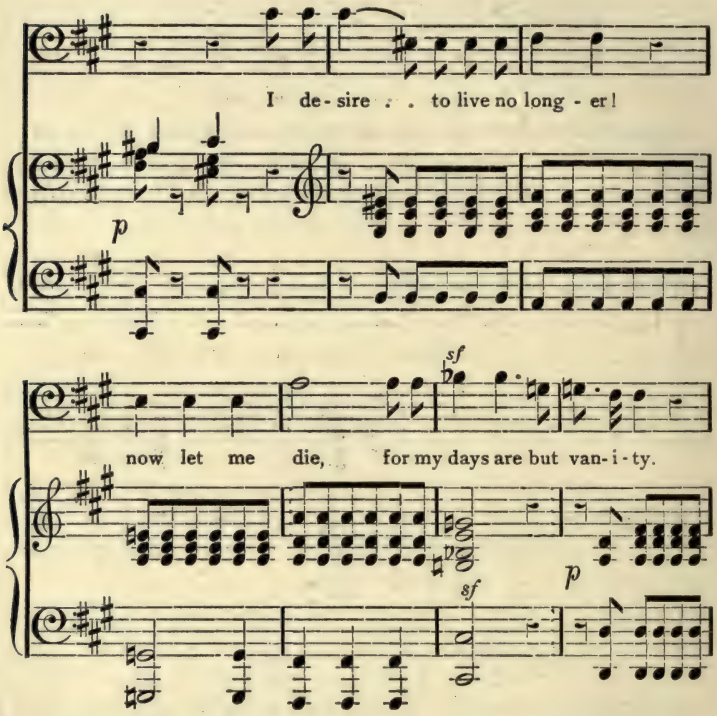
Then remembering that there is no human ear to hear him, only the omnipresent Jehovah, he prays to Him. He modifies his first half despairing, half upbraiding request.



And knowing that it is his lot to live for ever and for ever, he pleads still more fervently

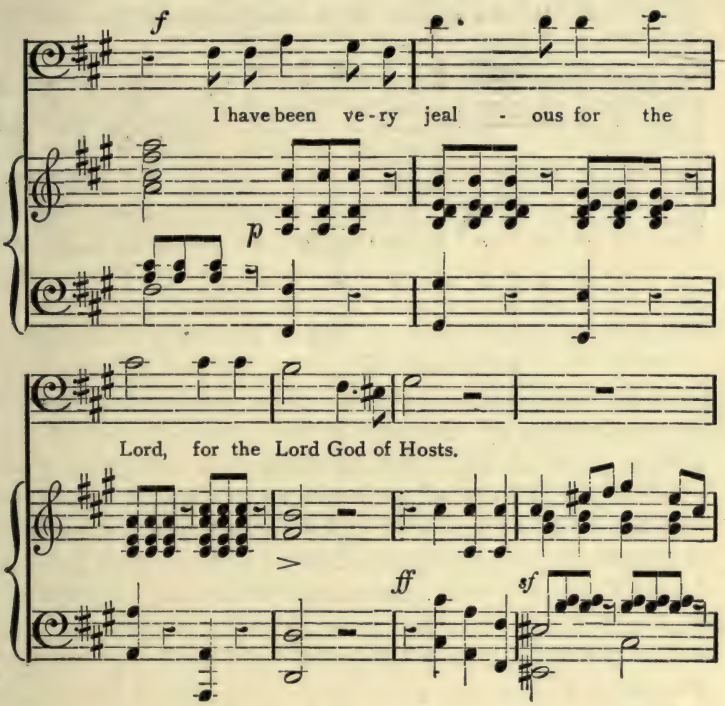


This short monologue has awakened Elijah and also the music which here indulges in an independent expression of views. Then he prays in a new vein, he is petulant and even argues with the Lord.

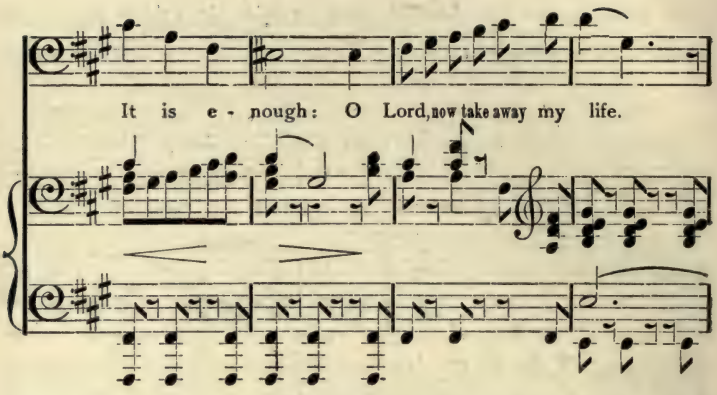


He remembers the galling sensation when he found that all his labour has been in vain, he remembers how he had punished the King, defied him and Jezebel and killed Baal's priests. During the passage of these thoughts the melody has risen to a climax and only calms down a little to enable Elijah to recount his activity and each time

that he pauses for breath the music thunders applause and cheers him on.



While recounting these stirring events, Elijah naturally recalls that the Lord's priests have been killed, that he alone of the Lord's champions has survived, that he has had to flee before an infamous woman, that the cause of the God of Israel is lost, that his people is no people, only one tribe of many in the vast Assyrian kingdom, he remembers his idleness and present helplessness and despairingly he asks to see death rather than the disappearance of a once chosen but now doomed people. With the same desponding words with which he awoke, he sinks down again into the burning sand:



The music too has collapsed and in the same weary strain in which it started it now dies out and monotony reigns.

The musical beginning and ending of this song, like the words, fulfil very thoroughly the conditions which the public expect. The reigning silence is broken in upon gradually and is reached again naturally. The melody and the song are complete in themselves, and can be sung independently of the rest of the Oratorio, and yet one knows that both have been prepared for most elaborately during the preceding hour, and that the end of the song is but the starting point for a new outburst of words and of music.

This single example, and no further ones will be attempted, suggests rather than proves that our musical pieces have two artificial ends, that real music may be eternal, without beginning, without ending, and that the musical pieces to which one listens are but fragments. That real music is everlasting is confirmed by Beethoven, who remarked that each of his works was but a fragment, stolen from the harmonious world of music in which his spirit mostly dwelt.

It will be noticed that many people affirm that it is impossible for them to grasp the idea of infinite space, of everlasting time. What they probably mean is that they

have a difficulty in believing that infinite space is filled with matter and that they cannot imagine an everlasting sequence of events. The idea of space having a boundary, of time ending or beginning is not so much an absurdity as an impossibility. One need but try to imagine that one's thoughts have reached the outer boundary of space, beyond all stars and beyond all matter, then there must be space beyond, the boundary cannot possibly be a mathematical point; the envelope of a limited space must be yet another space and another beyond it into infinity. Similarly with regard to time, a million or a billion years may pass, and events may be imagined to cease to occur but time itself continues into infinity. When there is no time, the past, the present, and the future would be happening together, and that is inconceivable.

It is different in a way with regard to objects in space and events in time. There is no apparent reason why such objects as stars and their satellites should exist, and there is equally no reason why some should exist at distances which the eye cannot reach, but it is certainly not inconceivable that both suns, planets, cosmic gases and dust can exist in every part of space, and that matter too may be infinite in amount. Similarly with regard to events. One sees that objects re-act on each other, and that there is always a reason why, and another cause for that cause, ad infinitum, and therefore it is difficult to conceive a beginning to any sequence of events. Suppose for instance that billions of years ago the Solar system was an inert nebula without motion of any sort, then it would have remained inert for all times, unless a comet from another part of space had penetrated the nebula, and had been arrested. It would set up a slight commotion, act as a centre of attraction and this change would gradually lead to the concentrations of the nebula into suns, stars, and moons. Even here therefore, the beginning of events will have been due to another, an outside event, and searching for its cause, and the cause of that cause, each

successive explanation leads once more to a never ending sequence of past events which led to the comet's travels.

Similar remarks apply in the world of music, time in that world is everlasting as it is in ours, and a beginning or an ending of musical events, provided that there must be a musical cause for the sounding of a musical note, is as inconceivable as the sudden appearance in the physical world of a something which was not there before. If a start were made in the middle of a musical piece it would at once be felt that a cause for the notes played is wanted. If a fresh start be made from a few bars earlier, the first played portion is explained but the same feeling reappears with regard to the new start, nor is this feeling in any way diminished until step by step the composer's artificial introduction is reached. The process can also be reversed. If only the first note of a musical piece or its first bar or two are sounded, there will always be the same desire to ask where is the musical cause for these sounds being produced and why do they cease, for they demand the continuation which is not played. If in the physical world a man slips he ought to fall, not to float in the air and similarly in the world of music, if a note is sounded it should be followed by others.

Having thus arrived at the conclusion that the general notion is wrong, that real music is of a fragmentary nature, it is permissible to enquire whether the modern tendency to write so called "programme music" is a truly musical one, and whether composers are producing real music when they use it merely for the heightening of poetical effects. The musical instruments with whose help music is conveyed to the hearing are limited in number and in capabilities, and a composer is of course justified in using the human voice if that is the instrument he requires, just as he is justified in using any other musical instrument; there can also be no objection to the singing of words, for not only can the human voice produce its best effects when uttering words, but vowels, because

they are compound sounds, are practically musical chords and as such may be turned to good account. There is, therefore, no reason why words sung by human beings should not be utilised in music either generally or for particular effects, but the case is different with regard to the interrelation of the meanings of words and their accompaniments. It is true that, as in the above song of Elijah, and in many others, the words and the music thoroughly harmonise, but a far greater number of examples could be cited in which they do not harmonise, and if in such cases the music as well as the song sentiments are powerful, the effect is not pleasing. In fact, composers as a rule fight shy of this combination, grand music being accompanied by a silly libretto, as in the "Zauberfloete" or by incomprehensible words in a foreign tongue. In such cases the real object of introducing words and ideas seems to be to give more detailed assistance to an artist for expressing the music than is possible with our musical notation. He understands the language in which he is singing, or at least should do so, and should produce the notes either tenderly, passionately, sorrowfully, or joyfully, as the libretto demands. Undramatic effects and occasionally intentionally comic effects are produced by songs having many verses but only one tune.

In short songs it should always be possible to harmonise the sentiments with the music, but in long pieces, the difficulties at once grow so serious that efforts to effect this harmony cannot be sustained. Words, and especially actions, if they are to appeal to an audience, must be sensible, cause and effect must follow each other as nearly as possible as they would do in real life, in other words the libretto should be as perfect as a theatrical play. Now if two particular melodies just suit two particular actions or sentiments, the former ought to change when the latter change, but this is more easily said than done. A passing event may change Hamlet from a dreamy philosopher into a vicious fiend, but that passing event will not necessarily

change the melody which is expressive of the one mood into another melody which is expressive of the other. In such cases the composer has three courses open to him. He may drag out the stage events so as to give sufficient time for the music to change from one mood to another, he may let his music develop as it likes and not trouble whether it accurately suits the changes on the stage, or he may throw musical sequence to the winds and change the tune whenever this is necessitated by what goes on on the stage or in the song. Carmen illustrates this last method. In that opera each character seems labelled with his own particular melody, and except that the actors do not appear together, and do not all sing together, the effect is somewhat similar to that produced by a number of singing birds—*e.g.*, the canary, the nightingale, the corncrake, the thrush, the peacock, etc. Each in turn sings his own song. In such operas, there are frequently, what might be called, scuffles in the orchestra during which the necessary changes from one melody to the other are effected. With catchy melodies the public readily forgive a musical impossibility, but they grow visibly impatient when the difficulties are more apparent than the means of overcoming them. Nowhere is this more apparent than in musical death scenes. In such cases the climax is reached when the dagger is plunged into the hero's heart, and generally this is associated with a musical climax, but unfortunately this climax seems incapable of changing suddenly into the silence of death, the musical death gurgle: final chords, are wanting, therefore the physically dead man has to go on singing his very best for a long time, whereas in real life the flow of blood, and the agony of death preclude this possibility.

Wagner has elaborated a method of getting over these difficulties which is both ingenious and effective. He prepares his audience from the very start to expect sudden discords and transitions into other keys and other themes. His music is, as it were, sitting on the fence, and ready to

jump or fall to which ever side events drive it. The effect is certainly dramatic, but take away the scenery and the acting and the result is far from musically satisfactory, and although his music is full of harmony and discords one cannot help wondering whether his is what might be called real music.

A similar unsettling effect is produced by so called programme music, which suits the critics because they can refer the public to the various motives by name, just as they can refer to the words of an opera, when discussing the melody, but the test of real music will always be whether it can stand alone without verbal explanations, and judged by this standard much modern music seems distinctly unreal. There can, of course, be no doubt that actions and situations of real life do inspire composers with musical ideas, but when once a start has been made with the piece, the melody, if developed along natural lines, will not be a portrait of real life conditions. Thus after Beethoven had written Fidelio, and he never wrote another opera, he possibly felt that its music had not developed as it should. He wrote an overture in which he allowed his musical feelings freef scope. Even that did not please him, and he tried again and again, and the result is his grand "Leonora," a piece of pure music which has been inspired by the contemplation of the heroic fidelity of a loving wife, but which does not narrate the successive events even of the opera. There is no dictionary word which even remotely expresses the combined love, courage, perseverance and sagacity of the heroine, but to Beethoven this want is apparently supplied by the third of the four overtures to this opera.

Strauss, either by natural inclination or in order to please the critics, goes to the trouble of explaining what musical labels he has attached to certain individuals, tendencies or conditions, but listening, for instance, to his Symphonie Domestica while reading his account of the meanings of the several melodies, one cannot but help

being struck with a feeling that the process is an arbitrary and artificial one, and from a musical point of view, degrading. It is all very well to say that a certain melody represents the father, another the mother, and a third the child, but the text fits the music better when these melodies are labelled Host, Guests, and Foodstuffs of a dinner party, and therefore one cannot believe in the reality of the offered explanations. Although one may be amused, one loses the enjoyment of an otherwise very charming piece. The account would roughly be as follows. The opening bars represent a dissatisfied petulant condition, as if the host and the cook were grumbling at the non-arrival of some guests and the spoiling of the soup and fish. At last the guest motive is heard, signifying the arrival of the late comers, one almost hears them say "how-doo-doo! how-doo-doo! how-doo-doo!" and the music goes on pleasantly while soup and sherry, fish and hock, etc., are being served. Things gradually change, and the concluding bars very faithfully represent the changing humours of the men over their wine and cigars.

Why, if music is intended to illustrate mundane events, has no composer of programme music written a dinner symphony? If melodies can portray physical objects, surely some could be found to suit the gliding sensation of a descending oyster, the more piquant effect of white-bait, and dignity of solid turbot or salmon. Expressive music might also be found for the many thick and clear soups, for various white and dark meats, for sweets, ices, coffee, cigars, and wine. Composers, no doubt, will say that this would be degrading music, but surely if music is to be descriptive it would be better to describe the pleasant sensation of eating and drinking than of babies crying in their cradles or the more dramatic ones of loving and hating.

It is, of course, not intended to suggest that music should be written on these lines, on the contrary these

possibilities have been adduced as warnings against the modern tendency to associate melodies with definite actions. One might as well, and this has been seriously proposed, associate certain notes and chords with colours. It is therefore encouraging to find amongst truly musical people, who listen to music because they enjoy it, and not in order to understand and if necessary criticise it, that they confess that after all there is no music like that which is represented by, for instance, Beethoven's compositions, in which development is natural and along simple lines, which gives the impression that the sequence of the various melodies and their interactions are correctly sketched, as are the actions in any life-like drama. They feel that in the same way as there is cause and effect in the physical world, so also there is cause and effect in the musical world. The material world has its laws of nature and so has the musical world.

LAWS NATURAL AND ARTIFICIAL.

Let it be assumed that, as was suggested in the last chapter, Beethoven was right, in his feeling about the independence of music, then, on examining not only his music but any music, it will be found that it is not necessarily swayed by the programme, but that it is governed by certain laws, as everything in the material world is governed by the laws of nature, and a very definite parallelism is thereby revealed between the world of music and the material world. This world exists in space and in time, whereas music has but the single universe: time. The sequence of events in this physical world is infinite and is infinite also in the world of music. This world is governed by the unalterable laws of nature, the world of music is also governed by the laws of harmony. Are these unalterable? Or are they arbitrary conventionalities like the laws of nations and the regulations of society?

And what is the nature of these human laws? In a constitutional empire the laws are not unchangeable, yet slaves and serfs would be inclined to imagine that the laws of a State are like the forces of nature, that they are ever present, unalterable. Their only remedy for sufferings is to break the laws, the remedy of freemen is to alter them. But even to the average man, laws are practically unalterable, for they are surrounded by much complicated machinery, such as police, prosecutors, clients, advocates, judges, prerogatives, etc., and they would not readily serve as an illustration of the nature of alterable laws. Social codes, customs, and regulations, although more changeable, are in their growth governed by some almost natural

law, so much so that their arbitrary character is nearly lost to sight, and their nature is difficult to unravel. It is therefore better not to deal with these complications but to turn to those simple laws which can be invented at any time and at any place; the laws which govern games. Of games, one of the most ancient is chess.

The fundamental law of this game is one which it has in common with music, according to which all moves have to be made on stepping stones, as it were. There is no gradual movement like the marching of troops in actual war, or in the now common Kriegspiel of military clubs. Each chess figure has to be moved from one square to another square, just as moves in music are made by striking first one note and then another. A violinist must not slide his fingers along the strings in search of the right notes, he must hit the right position with extraordinary exactitude, for errors of only $^1/_{300}$ of an inch can be detected by some human ears, and any one who misses the right position by $^1/_{32}$ inch is simply a very bad player. For convenience, the keys of a piano are made of considerable width, but each key represents an absolutely definite note, a single point in a long line of possible ones, and similarly each square of a chess board, although it is large enough to hold a chess man, represents only his theoretical position at the absolute centre of the square. He is in suspense while being moved from one place to another, he does not walk or glide, he disappears from one square of the chess board, his world, and reappears on another.

The next law of this game is that it must be played on a board which is divided into 64 squares. This is an arbitrary law, for the Japanese chess is played on a board with 144 squares. Then there is a law or set of laws according to which the chessmen must at first be placed on the two pairs of lines of squares at the ends of the board. Then there are a few simple laws as to the movements of chessmen. Then there is the law which may be

called the law of life to the game: that a move must be made first by one side and then by another, and not simultaneously as in war.

Although all these laws are ancient, history mentions that they have been altered from time to time. Formerly the queen could make no other moves than the king makes, now she can move almost anywhere. Castling is a comparatively modern innovation. The numerous problems published in our journals show that one set of laws is constantly being altered, for instead of placing all the chessmen in their proper places, only a few are used, and these are placed where desired.

It will, of course, be urged that these chess problems are merely endings of games and also that the players accept the conditions. This, however, is not quite true of a method of playing which seems to have nearly or quite died out. If players agree, the laws about the placing of the chessmen may be practically suspended, except as regards the pawns, these should be placed on their proper squares, but each player may place the other men where he likes, the placing being done either move for move, which gives a slight disadvantage to the first mover, or the placing may be done on either side of a screen, as in the case of military war games. Under the screen condition the now customary formation will generally be found to be the safest.

Let it be assumed that the players do not know the game and make wrong moves, that the queen is placed opposite the king, that the two bishops are found to be moving on the same set of squares, that the king moves into check without any declaration that the game is ended. If these things are done, then the players are not playing chess, but a game of their own, and if they are not agreed, then the game is sure to result in a quarrel. In order that their struggles shall be confined to the board and shall not result in angry words and blows, these players will soon find it necessary to agree on some very

definite rules, which, if broken make the game "no game."

It may safely be said that every law, rule, or regulation, whether applicable to criminal actions, commercial dealings, or social functions, including games, is based on the principles that the very natural tendency of human beings to wrestle with each other, to test their powers and if possible prove their own superiority, shall be carried out within well defined boundaries. Wrestling, a very natural and healthy pastime, has its varied laws which aim at reducing the chances of real strife and of deadly injury. There are the classical rules, catch-as-catch-can, permission to kick, to hit, and in Japan, to throttle. In the respective districts everybody knows these rules and is prepared for emergencies, to overstep these rules may mean murder, and that is dealt with by the more drastic criminal laws. Fencing and duelling are carried out on the same lines; the game is a more exciting one because the object is the death or injury of one opponent, but here, too, if the victor has won the game by breaking its rules he may have to pay for it even with his life, seconds and witnesses being provided for the purpose of reducing such mischances. They are there to see "fair play," to see that the rules of the game are adhered to. To Englishmen, it always appears strange that constitutional laws should permit fatal duels, for here one lives under the impression that the first object of a State must be to protect life, and an individual who in his breast can harbour deadly hate against a compatriot is a born criminal and should, one would think, be locked up out of touch with the rest of the world.

The very natural desire of most men to grow rich, and for rich men to parade the skill which has made them what they are, leads to all sorts of hazard games. Any one who breaks their laws is called a cheat. If a speculator, while keeping within the laws of the land, breaks through customs of the trade, which are merely laws of

the game, he is called a swindler and the business world shuns him; in case of the more serious infraction of the law of the land he is classed with thieves and goes to prison. If these speculator games are carried so far as to cause injury to the nation, the nation generally alters its own laws to suit the changed circumstances, and one sees that trusts and combines have been attacked probably from before the days of Joseph in Egypt, and monopolies of trades and of professions have since time immemorial led to revolutions.

Laws of games are thus seen to be mere conventions amongst the players, if they are broken then the game is not the game, people refuse to play under such conditions, and if money or life is at stake, the police are called in. In less serious cases umpires are asked to decide.

A social circle, though much larger than a chess board, is yet an insignificantly small world within a greater world; the social game is played like all others, in strict conformity with social laws; he who does not play the game in accordance with these laws is not in the game, he is a social outcast. Europeans differ from the Chinese, who have codified their 3,000 social laws; our social laws are kept as secret as can be, or rather they are reconstituted with each new generation, and it is the knowledge of these laws which constitutes the passport into one of the numerous small circles called society. The high cannot enter the society of the low, nor the low into the society of the high. One may learn the correct slang of a group of workmen, one may drink with them and live with them, but one remains an outsider and may perhaps be despised or taken for an outcast from one's own circle. The *nouveau riche* may do his best to imitate the nobility, but the mere fact of being a copyist amongst a class who profess to lead in social matters, is an infraction of the law of the social game. Here again it is seen that the petrified and numerous Chinese social rules and our own unwritten ones are merely conventions between indivi-

duals. This is true also of national laws, both criminal and civil. The past growth of the idea of property, implied conventions between individuals to respect it. As these conventions increased in number and importance they had to be enforced on a uniform principle, they had to be codified, and judges, prosecutors, and police were created to deal with those who did not conform with the rules of the game; they are the umpires of the game with powers to declare offenders to be "off side," as in football, and to place them in prison.

In no country, except in ancient Rome, has the growth of laws been as natural as in England, especially in commercial circles, where customs of the trade are recognised by judges as being of the nature of statutes, and are possibly based on real laws of nature and therefore not to be meddled with except at the peril of the State.

Most laws, however, are inventions. Several Greeks tried their hands at this pastime, generally, with dismal results, Plato's double fiasco with his scheme called "Republic" being the best known. The Roman Emperors were law makers, but their edicts were rather of the nature of acceptances of customs which had gradually grown into prominence, than mere inventions. Herein one may perhaps see the reason why the Roman laws have been the patterns after which many modern ones have been designed. The Americans and the French tried their hand at law making or inventing constitutions, and it is but natural that they should have been swayed by their past experiences. The French had suffered from the feudal system which led to the accumulation of vast properties in single hands, naturally therefore they made laws for sub-dividing property. They overlooked the natural law that a certain piece of ground cannot support more than a certain number of individuals, and the result has been that a naturally enterprising people like the Franks has degenerated into a stationary one. The

Americans seem to have been swayed by a morbid dread not only of a one man power, but also of oligarchies, they banished the idea of an aristocracy and saddled themselves with a plutocracy which has grown to be a recognised state danger.

It rarely happens that a law-giver comes in conflict with the physical laws of nature, but there is at least one picturesque illustration of such a case. A monarch who had made and unmade laws over Spain, Germany, and Italy, and to whom laws must have seemed as fleeting as the breath which gave them life, Charles V. who had had his own way ever since he was a boy, had become so spoiled that he thought he could lord it over poor simple pendulums, clocks having just been invented. He is found in his old age trying to synchronise their beats, but even in this little matter he, the past Emperor of millions, had absolutely no influence. Impotently he stood facing a few wall clocks which went their own way in spite of his powerful will. The sight is more humilitating even than that of Don Quixote tilting against windmills, which was a case of human strength pitted against aerial strength in which the weaker power was worsted. Charles V.'s example merely illustrates how the ignorant conceit born out of making and breaking laws leads to a belief that laws of nature can also be made or broken. Laws of nature have to be studied and taken into account, they can then be made subservient to the aims of humanity, but they will not allow themselves to be brushed aside, they will not be ignored. If a chemist were to insist that two elements which have no affinity for each other must combine if placed together, he would be laughed at, their juxtaposition would merely accentuate differences. If an engineer were to think of stopping the flow of a river, say by building a dam, he would be cursed by his neighbours for flooding their lands, and he would ruin all the millers who had been utilising the stream for power; if, however, he built more mills than the river could supply

with water he would be laughed at for his pains; and yet these are the very things which monarchs and national assemblies do day by day, if generations are counted as days.

The failures born of ignorance of the fathers lead to equal failures in the next generation, but in opposite directions, and nations either prosper or degenerate according as to whether or not there is a slight balance in favour of conformity with natural laws. The subject could be fitly illustrated by the rise and fall of the Roman Empire were it not too vast a subject even to be glanced at, in fact the very slow oscillation of nations governed by oligarchies is not easily studied, but the doings of small republics like those of the Greek towns, or of absolute monarchies are most instructive reading. Thus in Sweden one has a very clear example of an attempt to force a pendulum into an unnatural beat. The Swedes had settled on the shores of the Baltic, a most ideal position for a hard working, commerce and industry loving people, for although ancient Scandinavia must have been terribly exhausted by emigrations, of which Normandy remained the most lasting monument, the Swedes had again attained a commanding position at the time of the Reformation. To a restless spirit like Gustav Adolf the idea of utilising the power created by commerce and industry of a great people for the glorious object of war and supremacy in the council of nations was naturally so inviting that he overlooked the fact that a stream which has been led into numerous artificial channels for irrigation purposes, cannot at one and the same time be concentrated into one course for power purposes. He forgot that industry and commerce, relying as they do on security, cannot expand under conditions of warfare but must gradually die. Unfortunately for Sweden the lessons which should have been drawn from Gustav Adolf's experiment made absolutely no impression on Charles XII, who, while he was yet a mere boy, started on successful campaigns which resulted in reducing his once flourishing empire into a

sparsely populated province. Few monarchs except perhaps our own Stuarts have defied so many laws of nature as he did, one of his last acts being the debasement of his coinage, his majesty being pleased to believe that if the royal image were imprinted on brass buttons they would have the value of golden crowns.

German history is full of records of attempts to make pendulums swing in unnatural beats. Almost before Charlemagne had secured his empire from invasion and had initiated reforms which would have resulted in peace, industry and thrift, did he invent the feudal system which for many centuries prevented the Germanic tribes from becoming civilised. Henry reverted to the more natural conditions, but his son and grandson in their anxiety to emulate Charlemagne, Cæsar and Alexander as regards World Empire refused to believe that prosperity cannot increase during the wasteful process of war, and in their mad desire to dictate a world policy and to possess Rome, the ancient capital of a World Empire, they practically pawned away the whole of Saxony and Germany to feudal prelates and warriors. Fortunately for England similar dreams about World Empire indulged in by Edward III. and Henry V. were utter failures, but it must not be imagined that our modern statesmen are not even now standing in front of obstinate clocks which will rather stop than swing as they are told. English politicians may be correct in their view that the World Empire ideas which wrecked Rome, and France and ancient Germany, if persisted in will wreck both Germany and Russia, but they appear to be blind to the fact that the life of a nation follows natural laws which have to be studied but which cannot be altered. If it be desired that a pendulum shall swing and serve a useful purpose, no good but much harm is done by perpetually shaking the clock into unnatural activity, or by deadening the beat by restrictive friction. If it be

natural for England and her Colonies to unite it is harmful to try and obstruct this movement.

The art of weaving deserves attention, not only because it illustrates what is meant by an intermixture of natural and artificial laws, but also because it may help to a better understanding of music, to which weaving is slightly related, and about which, as will have been gathered from the previous chapter, some uncertainty must always prevail as to whether it is a real world, independent of all human influences or whether these influences seriously affect its working.

Ordinary fabrics consist of warp and weft. The threads which extend lengthways are called warp, and weft are the cross threads. If the one set were coloured white and the other black, then, in a simple cloth, the two sets of threads could be readily distinguished with the help of a magnifying glass and the surface would look like a chess board. By arranging the warp and weft differently various types of cloth can be produced, and the art of weaving or of designing woven goods is thus easily seen to be similar to a very elaborate game in which the weft is threaded above and below the warp in strict conformity with a preconceived design, which here stand for arbitrary human rules or laws. This game is of the nature of "patience," for opposing designers are not at work, each person creates and surmounts his own difficulties. The charm and difficulty of the game lies in the fact that it is not like an ordinary one in which there are only arbitrary human rules or laws, but that natural laws, laws which cannot be broken without making the cloth no cloth, are met with at every turn.

These natural laws are very simple and therefore leave an enormous amount of latitude to the designer, to the ordainer of artificial laws, but just because of this latitude the number of designs grows enormous, more particularly if one allows weaving to embrace both weaving proper and basket making in which both warp and weft are used,

as well as knitting, crocheting and netting in which only one thread is used, and lace-making in which many threads are used. Here it appears desirable to confine attention to a mere sketch of one branch, for instance, weaving proper, using only warp and weft.

In a weaving machine the warp threads have been threaded through a number of mails and are stretched horizontally between two rollers, the one winding up the newly made cloth as the weaving progresses, the other unwinding the warp. A certain number of warp threads are now lifted by the mails and a shuttle is shot across between the upper and lower warp, leaving a cross thread, the weft, which, after the warps are closed again, appears on the underside of those threads which were lifted and on the upper side of those which were lowered. Another set of warp threads are now lifted by means of their mails, another weft introduced and the manufacturing process continues. The designer decides which warps are to be lifted and the order of their succession. If he arranges that alternately the odd and even warps shall be raised then a plain sailcloth, calico or cambric is the result. If he arranges several adjoining warps to be lifted together and also decides that with each throw of the shuttle these sets of lifted warps shall advance one step to the right or left, then the result is a twill. Now here he will meet with a very important law of nature, or rather of weaving, he will find that if he raises more than a certain number of warp at one time, or continues to raise one warp more than a certain number of times, there will be no cohesion in the fabric. The same natural law limits the designer's liberty in the case of satins, sateens, and large pattern designs.

Should the designer decide to raise eleven warp in the following order, 1, 5, 9, then 1, 3, 4, 5, 7, 8, 9, 11, then 3, 7, 11, then 1, 2, 3, 5, 6, 7, 9, 10, 11, then as at first 1, 5, 9, etc., it will be found that the machine is turning out an upper and lower cloth, and what is more, the two

are joined at the edges and form a tube, as in the well known cases of canvas watering hoses and tubular lamp wicks. By altering the order in which the above mentioned lots are lifted, the second and third lot being changed to third and second, only one edge is now joined, which means that the loom is weaving a cloth double its own width but folded. If desired the cloth could be woven in many folds and made many times wider than the loom, but here one is hampered with another natural law, according to which the warp will not stand being pulled past its neighbours two, three, or four times more than is necessary with single cloths, unless it be made very strong and very smooth. This frictional wear is the reason why even in single cloths the warp has to be coated with a starchy substance which reduces the chafing effect, and here too human nature in a not very pleasing garb steps in. The size, which by the best weavers is made of sago, may be made of starch which, as it lends itself to being loaded with heavy earths and hygroscopic salts, permits of producing a finished article which looks substantial but grows flimsy the first time it is washed.

Seeing how several layers of cloth can be woven simultaneously on one machine, it is but natural that by introducing slight departures from the above mentioned order of raising the warp some intermediate threads of the upper cloth will mingle with the lower one and *vice versa*, whereby the two cloths, or both sides of the tube, become interlaced into one thick cloth. By this means a material can be produced of which the face may differ entirely from the reverse.

Even while leaving out of account all pattern designs, such as are found on table cloths, etc., it can be shown that by changing the order of lifting the warp, by using different thicknesses of threads and different materials, linen, cotton, wool, and silk, a multitude of different textures can be produced, each one being an illustration, a manifestation of the particular artificial human law

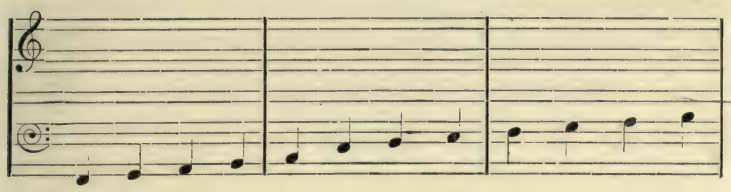
which in weaving is called the design, yet all these designs must be in accord with other natural and never changing laws, as regards strengths of threads, and as regards the order of raising the warp, otherwise the fabric is not a fabric.

By going a step further and introducing coloured threads, a few more natural laws have to be kept in mind, but, at the same time, the number of possible designs will be vastly increased. To be able to reproduce varied effects is the business of the designer, but unless he has acquired the knowledge which grows out of practical experience at the loom, he is sure to make costly mistakes.

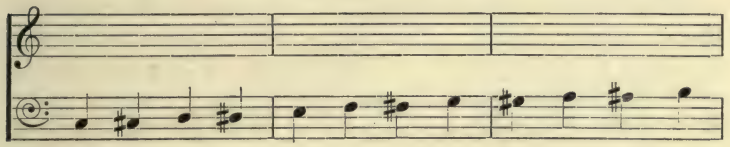
Now that Pianolas and similar piano-playing devices have become familiar objects, it is easier to explain some of the laws of music as compared with those of fabrics than would otherwise have been the case. The perforations in the pianola papers are in fact produced by the same mechanism, like a Jacquard box which in looms effects the raising and the lowering of warp, the perforations in the paper, representing the depressed warp, and the unperforated lines the raised warp; but of course a fabric woven from a pianola pattern would not hold together, because the natural laws of music are not the natural laws of weaving.

Now if all music were written in the major C scale in which only the white keys of the piano are played, then the present musical notation would correctly represent a pianola paper, except that the notes instead of being oval would be dashes, the full notes being twice as long as the half notes, etc., but in addition to the white piano keys there are the black ones which have to be played when other scales are used, and these are indicated in the ordinary musical notation by sharps (♯) or flats (♭). A notation which would be in strict agreement with the piano keys and the pianola strips would be as shown in the following sketch headed chromatic notation.

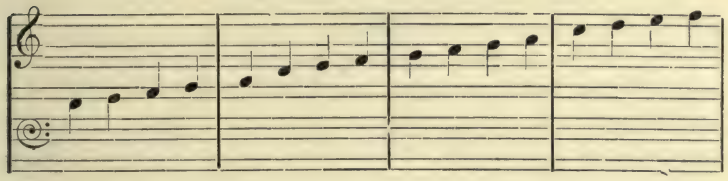
Chromatic Notation.



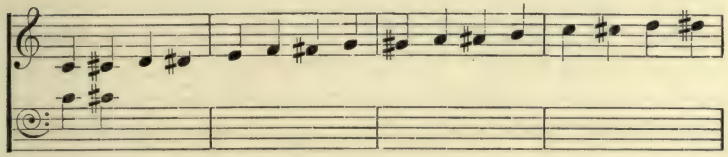
Ordinary Notation.



Chromatic Notation.



Ordinary Notation.



The two lower sets of lines and notes are the ordinary notation of the C major scale and are placed there for the sake of comparison. In the chromatic notation, which should be held left side up to make it agree with the piano keys, each black line represents a black piano key, each narrow blank space represents a single white piano key,

and each wide space represents two white keys. The C major scale notes would therefore, as on the piano, fall on the white spaces. This chromatic notation, in which all the notes of the piano are represented by equi-distant spaces is therefore a miniature copy of the pianola paper strips and every note means that a particular piano key has to be depressed, or if the piano were a weaving machine, it would mean that a certain warp has to be depressed.

The musical distance between two notes on the chromatic scale is called a semi-tone, which in the chromatic notation is represented by a step from a black line to the adjoining white space or *vice versa*. The musical pitch of a note depends, as is well known, on the number of vibrations which strike the ear in one second. Thus, supposing that for any particular note the number of vibrations per second is 100, then the first octave of this note has 200 vibrations, its second octave 400 and its third octave 800, its fourth octave 1,600, etc. The number of vibrations is doubled for each higher octave. In order to produce this doubling, for instance on a violin string, its length has to be halved, and that halved, and that again. Thus the lengths of the vibrating strings grow shorter while the number of vibrations grows greater. On the piano, and in the above-sketched chromatic notation, the two opposing changes are combined as it were, and the distances between successive octaves are all made equal. This is merely a matter of convenience, but it is a great convenience both for playing and for writing music, for as there are 12 semi-tone intervals in one octave, each piano octave need only be divided into 12 equal parts, and the result is twelve tempered or chromatic notes which are all equi-distant from each other. This subdivision cannot be carried out in so simple a manner when dealing with the number of vibrations, nor with the violin strings, for if, for instance, the first octave from 100 to 200 vibrations were to be divided into twelve

equal parts, each step would give $8\frac{1}{3}$ additional vibrations, but no sooner has the first octave been reached than the similar subdivisions of the next octave extending from 200 to 400 vibrations would require $16\frac{2}{3}$ additional vibrations for each higher note, and a sudden jump from an interval of $8\frac{1}{3}$ to $16\frac{2}{3}$ is evidently not correct. What is wanted is a steady increase in percentages, in fact the problem of producing a tempered scale is one of compound interest. Now the capital of £100 doubles itself in twelve successive years if the compound interest is fixed at 5·95 per cent., or nearly 6 per cent., therefore in order that the twelfth note shall have exactly twice as many vibrations as the first, each successive note on the piano must also have 5·95 per cent. more vibrations than the next lowest one. Thus starting with 100 vibrations for one note on the piano, the next has $100 \times 1{\cdot}0595 = 105{\cdot}95$, the next has $105{\cdot}95 \times 1{\cdot}0595 = 112{\cdot}25$, the next has $112{\cdot}25 \times 1{\cdot}0595 = 118{\cdot}93$, etc. The numerical increases of vibrations from note to note being 5·95, 6·30, 6·68, etc.

The strings of a piano are tuned in strict accordance with this compound interest principle, and the notes, which are absolutely equi-distant as regards musical pitch, have received the name of tempered notes. Now it is well known that the notes either of the major and minor scale are not equi-distant, five semi-tones having to be skipped in one octave, and other minor irregularities exist. By a curious coincidence, or rather on account of the happy selection of 12 semi-tones in the tempered scale, all the harmonic notes agree very closely with one or the other of the tempered ones. This is evident from the following table, in which under the columns "relative vibrations" are given the numbers of vibrations, C being taken as unity.

TABLE

RELATIVE NUMBER OF VIBRATIONS IN THE TEMPERED AND IN THE HARMONIC SCALES.

Notation.	Tempered Scale	Major Scale.			Minor Scale.					
					Ascending.			Descending.		
	Vibrations.	Vibrations.		Error per cent.	Vibrations.		Error per cent.	Vibrations.		Error per cent
c	1·0000	1	1·0000	0	1	1·0000	0	1	1·0000	0
♯*c*, ♭*d*	1·0595	...	.	..	..	..	..	..	..	..
d	1·1225	9/8	1·125	♭3·7	9/8	1·125	♭3·7	9/8	1·125	♭3·7
♯*d*, ♭*e*	1·1892	...	..	..	6/5	1·2	♭15·3	6/5	1·2	♭15·3
e	1·2599	5/4	1·25	♯13·2	..	..	..	..	..	..
f	1·3348	4/3	1·333..	♯1·9	4/3	1·333..	♯1·9	4/3	1·333..	♯1·9
♯*f*, ♭*g*	1·4142	...	..	..	..	..	..	..	..	..
g	1·4983	3/2	1·5	♭1·9	3/2	1·5	♭1·9	3/2	1·5	♭1·9
♯*g*, ♭*a*	1·5874	...	..	..	..	..	..	8/5	1·6	♭13·3
a	1·6818	5/3	1·666..	♯14·1	5/3	1·666..	♯14·1	..	..	..
♯*a*, ♭*b*	1·7818	...	..	..	..	..	..	9/5	1·8	♭17·1
b	1·8877	15/8	1·875	♯11·3	15/8	1·875	♯11·3	..	..	..
c	2·0000	2	2·0	0	2	2·0	0	2	2·0	0

Note. The numbers in the three columns headed "Error" are the amounts expressed in percentages of semitones, by which the tempered tones differ from the harmonic ones ; ♭ indicating that the tempered tone is flat, ♯ that it is sharp.

It will be seen that these errors, although small, vary considerably for the different notes. They are smallest for the seconds, fourths and fifths. It will also be noticed that the tempered notes are nearly all sharper than those of the major scale, and flatter than those of the minor one, which causes a disturbing effect while singing to a pianoforte accompaniment.

Thus it will be seen that although the musical octave has been divided by semi-tones into 12 equi-distant parts, the truly harmonic notes are not separated from each other by exact single or double semi-tones. The lines and spaces of the notation shown in the previous sketch should therefore not be absolutely equi-distant, but should vary

according as to whether the major or minor scale is being played.

These limitations and corrections must strike one as being very arbitrary. Why, is almost the natural question, cannot musicians content themselves with a tempered scale of twelve equi-distant semitones? Why must they have an arbitrary system of vulgar fractions? The reply is that the tempered scale is arbitrary, whereas the arrangement after vulgar fractions is one of the natural laws of the world of music which even the composer cannot alter. This law has its counterpart in the weaving, for instance of carpets, in which the warp is not uniformly spaced, because it consists of hard strings and loose woollen threads, the one set being closely packed, the other wide apart. Remove the threads and the fabric is not a carpet, but rather a blanket, remove the simple numerical relation of vibrations in music and there is no music, there is mere noise.

There is no reason for this simple relationship, this natural law, in the musical world, as there is no reason in our material world for gravity, heat, electricity, and their relations; they are nature's laws, unalterable, inexplicable. One may, however, enquire what these laws are.

It has been found that the simultaneous sounding of two notes has a most disagreeable aural effect except when the ratios of the vibrations of the two notes stand in some such simple numerical relation as can be represented by vulgar fractions, no larger numbers than six being used. It is also a matter of experience that the disagreeable sensation increases in intensity the nearer these simple relations are approached without being actually reached. The worst effects result when a pair of notes have approached each other to within a quarter or an eighth of a semi-tone. Perfect concord is thus fenced off by walls of disagreeable discord.

The simplest ratio of vibrations is one to two, the second note is called the octave of the first because, although

there are twelve semi-tones, there are only eight real notes in the scale from one to the other. Another simple relation is two to three, or one to 3/2. In this case the second note is the fifth of the first note, because there are five scale notes from the one to the other. In the case of thirds the ratio is either one to 5/4 or one to 6/5. Now 1, 5/4 and 3/2 can be sounded together harmoniously, for whatever pair is selected for comparison, their ratios can be expressed in vulgar fractions using no higher numerals than six. The same is true for the three notes 1, 6/5 and 3/2. The one combination is called the major chord, the other is called the minor chord. By advancing or descending in fifths from any of these notes, *i.e.*, by multiplying or dividing the numbers of vibrations of the three notes in either chord by 3/2, all the notes of the major and minor scales are created. In music only these and no other notes may be played, unless a change of key is carried out. The same law holds good in the new key.

It is thus seen that music resembles the game of chess in so far as that the notes, like the chessmen, are in suspense, unless they are struck or placed in position, and their positions are absolutely fixed by the laws of the musical world over which composers have no control. A note may not be gradually approached across its discordant barrier, it must not be felt for, it must be sounded correctly or not at all. The "attack" should be perfect. Playing music is like moving on stepping stones, and differs entirely from actions in this world in which movements are all gliding processes. Thus a melody may move from C to D or to E by disappearing as one note and reappearing as another, but objects of the material world, including human beings, move gradually and not in jerks. A journey from London to Paris is a gradual process, the traveller does not disappear in London, vanish into thin air, and then reappear out of nothing in Paris. If he did he would belong to another world; he would be a

ghost. In this sense musical notes are ghosts; they disappear and reappear and yet they exist.

A glance at the last table would almost suggest that there are two musical worlds, a major and a minor, and that the inhabitants, the melodies, of the one cannot reach the other. It would even seem as if there were many musical worlds, each scale representing a different one, and a melody played in one key could never, except by some unmusical process, appear in another key. That is not the case, or at least the music which one hears and which one enjoys, frequently changes from one key to another. The process by which this is effected is called a transition and is carried out as follows:—A chord is sounded, for instance, that of C major: c, e, g (1, 5/4, 3/2), then another note, generally the seventh is introduced as for instance b flat (16/9 or 1·777 . . .) which is the fourth of the fourth. It creates a discordant effect on the ear, for it is in harmony only with the absent f. Now the ear seems to be all attention as to why this departure is being made; then follows the chord f, a, e (4/3, 5/3, 2), in which at least one note also harmonises with b flat, and thus suddenly one finds oneself in the F major scale, of which b flat is the fourth.

This particular transition can be repeated 12 times and should then lead back to the C major scale, but the process is not perfect, and it will be found that the new scale is one-fifth of a semi-tone lower than that from which the start was made. Twelve transitions to the fifth lead to a better result, the new C scale being only 2 per cent. of a semi-tone higher than the original one, and this is the plan adopted when tuning pianos. Other transitions lead to other notes, including those of the minor scale, and others bring one back to the major. It is quite evident therefore that, without breaking any natural laws of the musical world, provided of course, that the transition rules are natural laws, almost any note can be reached, but the correct number of vibrations differs slightly

according to the path trodden. It will thus be seen that the spacing of the musical warp which is represented by the black lines in the chromatic notation may by repeated transitions be shifted bodily, and lines in any musical notation must therefore only be looked on as being an approximate indication of position.

It is, of course, possible that the transition chords are mere human inventions, devices for introducing changes which the imperfections of instruments have made necessary, or at least desirable, and may be likened to the changing of scenes and of time on a theatre stage. Such changes do not, of course, occur in real life, and certain playwrights, notably Moliére, adhered in their plays to the principle of maintaining unity of place and time, their actions not extending beyond a few hours. This is more consistent than such frequent changes as occur, for instance, in "Hamlet" and similar plays, but Shakespeare, by limiting himself neither to the one scene, nor to one time was able to portray real life far more effectively than he could have done had he started with the resolve of being strictly true to nature. The same may be the case in the world of music, change of key, corresponding to change of scenes, may not be strictly musical, but this is perhaps the best means of making one feel what real music is.

Glancing over books on harmony, counterpoint and musical composition generally, a host of musical prohibitions or laws are found, compared with which the few natural laws of weaving sink into insignificance. It is for instance stated that a single part should never proceed by any augmented interval, and if it proceeds by a diminished interval, it must return to some note within that interval. This restriction is not very serious, which means that a single part melody may move about almost as the composer likes it to move, provided he adheres to the notes on one scale.

The case is different in music with several parts, then

no two parts may proceed with each other in unison, seconds, fifths, sevenths, or octaves, and no part may proceed in fourths with the bass. Here are already very numerous and serious restrictions. Thus, if the C major scale be selected, one is debarred from playing on the black notes, or on the chromatic notation sketched above, no notes may be placed on the black lines. Certain chords may be played, but they must be changed in accordance with the laws just mentioned. In other words, one is not allowed to play even on all the white notes. Then there follows a string of further natural laws; if they are broken the result is not music but noise; one has left the world of music. Thus the upper and lower parts may not proceed by similar motion from another interval to a perfect fifth, nor may they proceed by similar motion to unison or to an octave. A lower part should not proceed to a higher note in one chord than the note assigned to a higher part in the previous chord, and *vice versa*. Extreme parts should not proceed from the eighth to the eighth between the tonic and the dominant; in a common chord the leading note may not be doubled; and the common chord of the second of the key may not be followed by the common chord of the key note; the bass may not approach a second inversion by a leap from the inversion of another chord; only the key note and the dominant may be employed as pedals; a passing note must be approached and quitted by the step of a second; except in a few cases a suspended discord may not be sounded together with the note upon which it is resolved; false relations are not allowed, etc., etc.

Of course these rules are mere words to those who have not studied music, and their recital here is only intended to show how large is the number of natural laws even in the simple world of music which does not exist in space and has neither length, breadth nor depth, only time. These are real laws, not made by man, not even by the musical creator, the composer.

Another and perhaps a more difficult set of rules deals with rhythm, with the intensities and durations of the soundings of notes and of pauses, a subject into which the Eastern Indians have attained a deep insight. Here one meets with what must be called a mechanical difficulty, a clashing of the laws of the musical and physical worlds. For instance it is obvious that a note cannot be sustained on any percussion instrument such as the drum and the piano, and if the melody demands that a certain note shall be sustained, musicians meet the difficulty by various means, very commonly by repeating the note over and over again. With other instruments this particular difficulty does not occur, but a more serious one presents itself on account of limitations of compass and on account of a certain set of accompanying notes called partials. Thus one is face to face with the difficulty that the laws of nature clash with the laws of music. No musical instrument produces pure monotonic sounds of only one set of vibrations. Musical sounds are always chords, and these chords are in the majority of instruments very complex and therefore not harmonic, while the simpler sounds such as are produced by the flute sounds of an organ are generally not of the character required by the music and have an unsatisfactory effect. The science of instrumentation consists in harmonising or at least finding a *modus vivendi* for the law of harmony, which is the natural law in the musical world, with the law of the over-tones, partial tones or harmonics of the musical instruments which has a physical basis.

The harmonics can easily be studied with the help of a violin or cello, and are by Chladin said to extend to the fifth octave. Let the open string be tuned for instance to sound C, then if the string be pressed on to the finger board at the centre of its length it will sound the octave; if the string be lightly touched at its centre the octave will still be sounded, but both ends of the string, instead of only one end, will vibrate. By drawing the bow across

a suitable position of the string and then gently raising the finger from its middle position one may perhaps be able to see that this point does not vibrate, it is called a node. The string will appear to be quiet at its centre but will be vibrating strongly at either end. If now a finger be lightly placed at a distance of one-third the string's length from the bridge, then on drawing the bow across it, the fifth of the octave of C will be heard, and on looking at the string one discovers a nodal point, at both thirds of the string's length. There are now practically three strings at work of the length of one-third of the full string. The fifth produced in this manner sounds stronger than if only the upper third of the string were vibrating, which would be the case if the finger were pressing it down on the finger board. If now one finger, lightly touching the string, be advanced along to one-quarter, one-fifth, one-sixth and smaller fractions of its length, the corresponding harmonics are heard, jumping suddenly into existence when the long portion of the string is perfectly divisible by the short length. Under ordinary conditions a violin string produces not only the fundamental note of the full string, but also, though with diminishing intensity, all its harmonics, and if one could follow the vibrations of the string one would notice that in addition to the vibration of the whole string, its parts also vibrate, but the nodal points, being carried about by the swinging of the whole string are not seen, except perhaps when the bow is drawn across particular points. In such cases the full note will be less strongly heard than its octave or perhaps even than the fifth of the octave. Under ordinary conditions of playing these harmonics ought not to be obtrusive, and a good artist will draw his bow across the string at a point where it has a damping effect on them. The hammers in a pianoforte are also placed with due regard to this object.

In the construction of trumpets the reverse effect is aimed at; not only are they made to give forth many

harmonics, but any single harmonic can be easily accentuated, so that by a slight alteration in the method of blowing and by a varied tension and shaping of the lips of the performer, he can sound or accentuate any of the available partials, and can thus play melodies without using stops. One of the charms of brass instruments, in spite of many defects, is the possibility of simultaneously sounding two harmonics and thus producing the full effect of chords.

Another very wonderful instrument is the human throat, mouth, etc. With but very slight efforts, both the pitch of the voice and the number and intensity of the harmonics can be altered, whereby the various vowel sounds are produced. Most people can hear that the ŭ or oo sound is very pure, containing perhaps only the merest trace of the octave of the fundamental note. By careful listening to the ĭ or ee sound it is easy to hear the deep fundamental note or drone, like a deep oo, and also some very high harmonics, all the intermediate ones being absent.

The methods of analysing sounds are as yet not very perfect, and although everybody can distinguish instruments by their sounds, and though nobody seems to have any difficulty in detecting the slight differences in the vowel sounds of different nations and different districts, yet the exact composition of vowels and instrumental notes which constitute these differences are not well known. The summary contained in the following table must therefore be considered as being only an approximation to the truth. In fact recent investigation seems to indicate that the vibrations of some sounds are of an irregular or artificial nature.

COMPOSITION OF INSTRUMENTAL SOUNDS AND OF VOWELS.

No. of relative vibrations of partials	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Musical Notations	c_{-2}	c_{-2}	g_{-1}	c	e	g	b	c_1	d_1	e_1	f_1	g_1	a	a	b	c_2
Wind Instruments.																
Trumpet	The upper partials extend to g_2															
Clarionet		...	f	...	f	...	f	...	f	...	...	...	...	...	...	..
Organ stops																
Open diapason	ff	f	mf	p	...	...	...	...	...	...	...	...	...	...	...	..
Flute	f	f	f	mf	p	...	...	...	...	...	...	...	...	...	...	..
Gemshorn	f	p	p	p	f	f	f	...	...	...	...	...	...	...	...	..
Close diapason	f	...	f	also odd higher partials if strongly blown.												
String Instruments																
Harp	100	81	56	32	13	3	...	...	...	...	...	...	...	...	...	..
Piano, high notes	100	100	9	2	1	0·01	...	...	...	...	...	...	...	...	...	..
,, medium notes	53	100	53	9	...	0·25	...	...	...	...	...	...	...	...	...	..
,, low notes	40	100	97	48	11	0·52	...	...	..	...	...	...	...	...	...	..
,, metallic hammer	20	64	100	100	64	20	...	...	...	...	...	...	...	...	...	..
Violin and 'Cello	ff	f	mf	p	pp	still higher partials are very weak.										
Rebeck	ff	...	...	f	...	...	...	...	mf	...	...	...	...	...	...	p
Musical box reeds	ff	...	..	...	...	...	...	...	f	also squares of 5, 7, 9, etc.						
Bell	ff	f	...	f	f	f	...	...	..	...	...	...	...	...	...	..
Vowels																
u or oo	ff	p	...	...	...	...	...	...	...	...	..	...	...	...	...	..
o	mf	f	p	...	...	...	...	...	...	...	...	..,	...	...	...	..
Swedish ö	mf	mf	mf	f	f	...	...	...	...	...	...	...	...	...	...	..
a or ah	...	f	f	p	ff	ff	...	...	...	...	...	...	...	...	...	..
e or eh	mf	mf	...	...	...	ff	ff	ff	...	...	...	...	...	...	...	..
i or ee	ff	also some undetermined very high partials.														

Note. In this table, ff, f, mf, p, and pp have the usual musical meaning from *fortissimo* to *piano*. The loudnesses of the strings are given in numbers, 100 standing for ff.

A mere glance at this table suggests very forcibly why occasionally a change of instruments and vowels has to be made. In the Sol Fa system of singing, even while continuing in one key, there is practically a series of transitions. Thus, adopting the tabled values for the upper partials, it will be seen that *doh* consists of the bass note, its octave and its fifth, while with *ré*, a rather impure seventh, is introduced which finds considerable relief when the *mi* sound follows.

The braying of an ass, "ee! ah!" is a comic though natural application of instrumentation principles, which is copied in the nursery song "See-saw, Marjory daw." The song would produce a totally different effect if one were to sing only one vowel: "See-see, Meejory dee," or "Saw-saw, Mawjory daw." The fact that vowels are chords accounts for the annoyance which many people feel when a song is sung in another language than that in which it was composed. If the composer has arranged his notes so that they are suitable for the upper partials ah, e, ah and i=ah−ee as in "Jag elska dei," then if by translation the vowel sounds ah−ee, o and oo are respectively substituted as in "I love you," a wrong effect is necessarily produced.

These difficulties of instrumentation are mentioned here merely with reference to the effect of the interaction between physical laws, or rather of the laws of the upper partials of instruments, and the harmonic laws which are the natural laws in the musical world; but the question may well be asked whether, after all, the music which one hears and enjoys is a real world of its own, in which its own laws are strictly followed, or whether a feeling of the physical impossibility of producing pure notes has gradually settled down to our being satisfied and even pleased while listening to a jumble of subdued discordant sounds, dealt with, however, in such a manner as to make them appear as if they had a right to exist in music.

The question as to what real music is does not, however, affect the subject of this chapter, which was an enquiry into the nature of laws in general, and is intended to have made clear the difference, both in our world and in the world of music, between laws of nature and arbitrary ones. Those of the one set are unalterable and everlasting, those of the other change in accordance with human requirements. Lilliputian potentates may make and enforce laws that breakfast eggs must be opened at the larger or smaller ends, but they cannot make laws for

water to run uphill, and even Charles V. could not make a pendulum swing a millionth of a second faster or slower than is fixed by nature. Similarly no composer will ever be able to ride rough-shod over the natural laws of music. The physical and musical worlds are therefore similar in this respect that they have each their own unalterable laws.

THE ESSENCE OF MUSIC AND OF LIFE.

THE possibility has already been hinted at, that the music which its lovers appreciate may, after all, not be the real music of which it is here assumed that it constitutes a world of its own, and this doubt, as well as the impossibility of defining what music is, would make it somewhat difficult to carry out an analogy between music and life, were it not that the question: "What is life?" also waits an answer, and that by putting these questions in a different form perhaps some insight into this double problem will be attained. What is the essence of music, and what is the essence of life? There is, as yet, no very obvious reply to the second question, but as regards music, few would hesitate to say that its essence is vibrations. Yet, remembering that light, too, consists of vibrations and that light is not music, and that even rapid changes of light produce no effect which at all resembles melody, it seems desirable to modify this remark and to say that music consists of changes of vibrations of elastic mediums, and that these changes are carried out in strict conformity with a law called harmony, and also that there are larger sub-divisions of time which are called rhythm. The combination of the two sub-divisions is known as melody. Now both melody and rhythm are each only parts of music, and the idea suggests itself that music may be defined as a dualism, each member consisting of sub-divisions of time, the musical vibrations measuring from about one-thirty thousandth part of a second to about one-thirtieth of a second, whereas the musical periods of rhythm vary from fractions of seconds to fractions of hours,

the sub-divisions of symphonies being part of the rhythm of the piece.

Casting around for another example of a similar sub-division of time into two interfering groups, attention is at once directed to the planets. They circulate around the sun at definite rates. Viewed from outside, satellites would seem to oscillate or vibrate from side to side of their primaries, while these move majestically from side to side of the sun. In fact, the general harmony of the movements of stars has, even in ancient days, caused the term "Music of the Spheres" to be applied to the movements of planets. The periods of those planets which were known to the ancients corresponded to the musical octaves and fifths. Thus Mars, the Earth and Mercury represented the fourth, fifth and seventh octave of Saturn, while Jupiter represented the second fifth of Saturn, and Venus the fourth octave of Jupiter. No sooner had Galileo discovered Jupiter's satellites than the same harmony was discovered amongst their periods, and now that more powerful telescopes have revealed Uranus, Neptune and about two dozen satellites of the planets, and as their periods are all fairly harmonious, as will be shown in the chapter on Matter, it is even more correct than formerly to speak of the music of the spheres. While tracing out this idea the further relation manifested itself that the periods of revolution of the satellites stand in the same relation to the periods of their primaries as do the vibrations of single notes to their usual durations. Thus notes of about the pitch of C_2 have 516 vibrations per second and are in a general way sustained for one quarter to one-third of a bar, or say for one quarter second, which gives 154 vibrations per duration of each note. C_1 with its 129 vibrations is generally sustained for one second or more, while the bass notes with vibrations as slow as 32 per second are sustained for considerable periods, as drones. In a general way, therefore, the oscillations or rather the revolutions of satellites may

be likened unto musical vibrations, while the revolutions of their primaries round the sun correspond to periods which one feels as musical measure. In this sense, one may think of "Music of the Spheres."

In view of the fact that music has no existence in space, but only in time, and that, therefore, its essence must be sought for in time alone and in its sub-divisions, one may not unreasonably draw a parallelism between the star periods and the musical period, and thus confirm the view about music being a dualism, one partner consisting of rapid vibrations or sub-divisions of time of more than thirty per second, the other partner consisting of longer sub-divisions varying from fairly large fractions of seconds to minutes and perhaps hours. In other words, the essence of music is that it is a dualism consisting of melody and rhythm. Both partners exist only in time, both are based on harmony of numbers. They differ, however, in this very important point, that whereas rhythm can lead an independent life, as in the drum beating of the Orientals in tattooes, etc., melody, without rhythm, is inconceivable. Notes or chords, however harmonious they may be, would not be music if their order and their duration were unsettled. A melody would be completely changed, it would not be the same melody, if the long notes were played short and *vice versa*, or if the order of the notes were changed.

Surveying these two components of music, it strikes one as if rhythm were an independent and careless master who goes his own way, come what may, nor does it seem to matter to him whether he is accompanied by his partner or not. Melody has to be carried, she cannot walk alone, and yet she gives the impression of being the superior. Tied to her partner, her vagaries of mood lead him a chequered life which impresses itself on us as if a perpetual striving were maintained between the two. They seem to have divergent aims. Rhythm seems to wish to be left in peace; he would, one might think, be

content to live an everlasting monotonous life like the moaning of the harbour bar. Melody, on the other hand, loves change, yet is never without her supporting rhythm, to whom she is tied as to a stolid partner who would fain make her lead a decorous and well regulated life. She would gladly do without him if only she could exist alone. Occasionally, and to a limited extent, she may succeed; she may leave one musical measure for another, and yet she will be recognisable as the same musical theme, but when she attempts to live alone, when she attains to the position of pure harmony of vibrations, then she is dead as a melody, she is lifeless, a mere statue, an image and a monument of her former self. Mere harmony is more lifeless than the most monotonous rhythm, a peaceful Nirvana reigns in the place of melody as death reigns in this realm of silence. Is this the essential condition of those extraordinary harmonious but unmelodious jumbles which are so frequent in modern musical pieces?

Musicians make use of the aspiration of melody to be freed from rhythm, when, to meet the wishes of their tired audiences they have to end their pieces; they then harmonise melody and rhythm, they strike a few harmonious chords which give the impression of finality and of rest, a rest which allows the hearers to re-transfer themselves to their own world.

If now attention be turned to the physical world, and the question be asked "What is the essence of life?" several answers suggest themselves, but the one which is at once in close harmony with the answer given about music, is that life also is a dualism in which the partners are matter and energy, and also that, like rhythm and melody, matter, one of the partners, is sluggish and independent and capable of existing alone, whereas energy, though restless, is tied to matter, and yet, as it were, is always striving to be freed from it.

It is intended in the following chapters to accept this analogy, and to deal with life from this point of view.

Matter claims first attention, and an attempt will have to be made to give some idea as to its distribution in space, both as regards quantity and diversity of quality. Unfortunately, this cannot be done without a few calculations, in which millions and billions have to be freely used, and finding that some classical notions about the building up of our own planetary system do not fit in with the views which force themselves to the front, it has appeared necessary to make suggestions about cosmic matter which seem more plausible than those invented by Kant and Laplace, who died long before any of the modern views about matter and energy had been mooted.

Energy will then have to be dealt with; it will be followed step by step through its many specialised forms and finally recognised as organic life. The process cannot here be summarised, but it seems desirable, while reading through the following chapters, to be well on one's guard against a feeling that a highly specialised form of energy grows out of a more lowly one. That is not the case. Mechanical work and electric energy are convertible, the one into the other, but electrical energy has not grown out of mechanical work, as leaves grow out of a tree, or as one species is evolved out of another. In the following chapters the various forms of energy are merely placed one after another in a sort of natural order, in which the higher manifestations of energy combine the special characteristics of all the preceding lower ones, and add one or two new ones. The meaning of this cannot be made clear without a knowledge of what follows, but a brief list may be of some future service.

Starting with the simplest form, according to general notions of energy, there are attraction, potential energy, *vis viva*, work, heat and light, electricity. Amongst these, energy appears merely as a striving, with perhaps a tendency to free itself from sluggish matter, or at best to be tied to as little matter as possible, a tendency which

reappears in all energy manifestations and may generally be recognised as economy.

In chemical energy a restless striving like attraction, now called affinity, is recognised, a desire on the part of energy to be liberated from matter and to pass as heat into the much lighter medium, ether. In addition, there is discovered a kind of chemical inertia or friction, which adds great stability to chemical compounds, but which, although in itself it represents merely a slight amount of energy, nevertheless it may produce enormous results, in the same way as the release of the trigger of a gun initiates the explosion of the gunpowder which follows. Chemistry also reveals another specialisation in the form of catalytic energy. This is possessed by some chemicals and consists in their acting as agents, often insignificantly small, which bring about chemical changes of great importance and magnitude.

In organic energy all the previous specialisations reappear, including catalytic energy, and a new one, which may be called cell or life energy. Like the one just mentioned, an insignificant agent brings about great chemical changes, or, as they may now be called, organic changes, but these are not changes which the surroundings desire and which a catalytic agent merely initiates, but changes which the germ itself desires, generally its own reproduction or modification.

This germ-energy appears in the most wonderfully modified forms in all higher manifestations, and is recognised even in the statesman who utilises the energies of nations for the furtherance of his wishes. His, often very successful, rival is content to be a catalytic agent, sitting on the fence, watching which interests are tending towards antagonism, and then leading them into battle, or at any rate, initiating the fray.

Another point may here be mentioned, and that is that energy, being blind, is easily trapped into degenerating

into a lower form, as organic life degenerates into chemical energy, as in cases when death sets in.

As already mentioned, these remarks, being more of the nature of a summary, are not easily understood except after a perusal of what follows, and a start will therefore be made with the subject—"Matter."

MATTER.

The most natural feeling about matter is that it is everlasting or indestructible, but when one watches a tiny seed growing up into a large tree, though neither Heaven nor Earth contains the wood necessary for its construction, and again when this wood disappears if thrown into a fire, the intellect warns one not to be guided by natural feelings. This warning had been preached to such good purpose in the past, that people believed that gods at least could create things out of nothing, and in later days alchemists professed to believe that iron and lead could be changed into gold. Their mercenary labours have not been entirely wasted, for when they introduced the balance into their laboratories they created the science of chemistry, and chemistry has confirmed what man in his early ignorance merely felt to be true, that matter is indestructible. Chemists can burn diamonds in oxygen. These disappear and even the volume of the air supplied does not change, yet one should not be misled into believing that the carbon has disappeared, one must weigh the things before and after combustion. Then it will appear that the oxygen has changed, has become heavier, so that in a sense the diamonds have merely been volatilised; they have not been lost and could be recovered, but only as black carbon, for crystallization is still a mystery. A change of form has taken place but no destruction of matter.

If a drop of silvery mercury and some yellow sulphur be mixed together and then heated, the mass sublimes, *i.e.*, volatilises and condenses as a hard mass. On breaking up the product and carefully grinding it till it is an

impalpable powder, vermilion is produced. Vermilion is a chemical compound of sulphur and mercury, but it has none of their properties; it is not fluid like the one nor will it melt like the other; it only sublimes when heated. Its colour differs from that of its constituents and so do all its other properties, but the weight of the vermilion is exactly equal to the weight of its constituents. If vermilion and iron filings were to be mixed together and heated, fumes would escape which if condensed and collected would be found to be mercury of exactly the original weight. The sulphur has gone to the iron and formed another substance, sulphide of iron, from which by a somewhat more complicated process, the sulphur could also be regained. Nothing has, therefore, been lost, matter cannot be annihilated. These experiments can be repeated, in one way or another, on all the seventy odd chemical elements, but in every case, careful weighing establishes the fact that matter can be changed but cannot be destroyed or created. One notices, as in the above case, that the chemical elements can combine to form new substances, having totally different properties, but as these changes always imply the interaction of energy, the subject will have to be dealt with later.

Matter is said to consist of molecules, which are the smallest particles of chemical compounds. Molecules demand the existence of a retaining medium which scientists have called ether, and they have endowed it with most wonderful properties, to wit, it is weightless and yet material, it allows matter to pass through it without resistance and yet it is a solid. These assertions are very wonderful but are implicitly believed in by many.

The question at once suggests itself what is the amount of indestructible matter in the universe? Or the less difficult one as to the amount of matter per cubic mile or kilometer? The mass of the earth weighed on its surface is 5,987 trillion tons ($5{,}987.\ 10^{18}$). The sun's mass is 316,000 times greater or 189 quadrillion tons (189.10^{24}).

Who knows how many millions of suns there are and how can they be weighed? Some, it seems, are much heavier than our sun, others are lighter. In addition there are the non-luminous heavenly bodies. They cannot be seen nor counted but they are known to exist even if for no other reason than that our planets are non-luminous; so are the asteroids, so are the meteorites, and one may feel fairly certain, for instance, that Algol and a few other stars of this type consist of one bright star with a dark companion. It is impossible without going into a few calculations to convey even the faintest idea of the enormous amount of matter in the universe and its distribution, but the subject will be dealt with on the simplest possible lines. Astronomers can weigh the masses of stars only when they are found in pairs, and of these there is a fair number in the universe, but the measurements are exceedingly delicate and, as yet, not over reliable. Those few stars about which the fullest information is available are collected in the following table, which contains the estimated masses and the parallaxes, measures which express the distances. The magnitudes of the stars are also contained in the table as well as estimates based on these, which are of interest as showing that for other stars whose masses are not known, one may, when the spectrum is ascertained, make reasonably fair guesses. The sixth column of this table, giving the ratio of light value to mass is also of interest in so far as that this ratio is approximately proportional to the products of the stellar brilliancies into the heights of their atmospheres. Too much importance must, however, not be attached to any of these estimates, for the parallaxes are often unreliable to the extent of 0·02 seconds of angular measure, whereby both the masses, distances, and other values are in some cases made uncertain by several hundred per cent.

BINARY STARS WHOSE MASSES AND DISTANCES ARE KNOWN.

Name of Star and Orbits of Companions	Masses	Parallaxes	Distances in Light Years	Magnitudes	Light ratio to Sun	Light value / to Mass	Spectrum type (letters) with remarks about Stellar atmospheres
		″	Years.				
α Aurigae (Capella)	18·4	0·087	37·4	0·21	131·0	7·1	(G). Like sun.
85 Pegasi	11·3	0·054	60·3	5·83	2·24	0·20	(Ma). Probably cold. Carbon present.
β Aurigae	5·0	0·067	54·3	2·07	49·6	9·9	(A). But peculiar. Much hydrogen. No helium.
						Say	
α Canis Min (Procyon)	3·0	0·341	9·5	0·48	6·5	2·0	(F5G). More hydrogen than on sun.
Small Comp. (0·87″)	0·63	,,	,,	12·0	Small	---	—
α Canis Maj (Sirius)	1·75	0·377	8·6	−1·58	35·6	10·2	(A). Much hydrogen. No helium.
Dark Comp. (7·8″)	1·75	,,	,,	Dark	0	---	—
γ Virginis (Porrima)	1·65	0·074	44·0	3·7	7·4	4·5	(F). Little hydrogen. Much calcium.
Companion (5·7″)	1·65	,,	,,	3·6	7·3	4·5	Ditto.
70 Opiuchi	2·94	0·162	20·1	4·07	1·05	0·36	(K). Comparatively cold. Much calcium.
Small Comp. (4·5″)		,,	,,	?	Small	?	—
α Centauri	2·00	0·752	4·3	1·36	1·47	1·4	(G). Like sun.
Companion (17·7″)		,,	,,	1·61	0·47	?	(G). Like sun but colder.
δ Equutei	1·00	0·071	45·7	5·4	1·67	1·75	(F). Like sun.
Equal Comp. (0·4″)	0·89	,,	,,	5·4	1·67	1·75	(F). Like sun but much calcium.
η Cassiopiae	1·62	0·154	21·1	4·0	1·74	1·07	(F8G). More hydrogen than on sun.
Companon (11·4″)	?	,,	,,	7·5	Small	?	—
κ Pegasi and a Spectroscopic Companion	0·48	0·106	30·7	4·27	2·06	4·3	(B8A). Probably hotter than sun.
α Geminomum (Castor)	0·20	0·198	16·4	2·7	2·50	?	(F). Much hydrogen. No helium.
Companion (5·75″)				3·7	1·00	?	Probably heavy atmosphere.
Sun	1·00	---	8 min.	−26·4	1·00	1·00	—

As regards spectroscopic observations in general, one has to remember that they are as yet in their infancy and proper significance cannot be attached to their indications. How complicated the subject is will appear from the following. In 1901 the star Nova Persei suddenly flashed out with a brightness denoted by a magnitude of 0·21. Most probably two stars, either faintly luminous or dark, had collided. The enormous heat which was thus generated must have melted and volatilised the combined mass, but at first it occupied a very small space and it was only after months that it had expanded millions of miles to form a faintly luminous nebula. This enormous expansion cooled the incandescent gases, and Nova Persei not only rapidly lost its brilliancy but it also pulsated. It became, in fact, a variable star. It is strange that no one has utilised these carefully measured periods for estimating the density (according to Ritter) and with it the mass of this star. In 1910 Nova Persei was still under observation, but reduced to a 10th magnitude star, visible only through the most powerful telescopes and its spectrum is now said to be of the Wolf Rayet type. One may expect that as the star shrinks, due to loss of more and more heat, it will, strange as this may sound, become brighter. Its spectrum will then perhaps change to one of the (B) Orion type, believed to be emitted by very hot surfaces. Continued cooling ultimately results in a gradual darkening and the spectrum should gradually pass through the (A) Sirius type, the (F and G) Solar type, and slowly through various stages down to the dusky Aldebaran type until blackness is reached.

At present apparently little more can be said about the condition of stars than that they have lined spectra and that their atmospheres contain helium, hydrogen, and other gases and the vapours of carbon, iron, and other metals, or that their spectra are continuous, indicating that certain stars may now be red hot and perhaps not surrounded by atmospheres. Much more

careful work will have to be done before this classification can be of real service. There is to begin with the possibility, nay, probability that different types of stars are composed of different materials. For instance, even in our planetary system Mercury has a mean density of 6·22, iron being about 7·8, whereas Saturn has a density of 0·72, water being 1. Mercury may therefore consist largely of iron and other heavy metals while Saturn may consist of condensed helium, hydrogen, nitrogen, etc. Fluid hydrogen has now been found to have a density of one-eleventh that of water, while gold is 240 times as heavy as hydrogen. If Mercury and Saturn were carried far away from the Sun and heated to incandescence, the spectroscope might detect helium, hydrogen, etc., in Saturn's atmosphere, and iron, nickel, and copper, etc., in that of Mercury, but only, and this is of importance, if Mercury be made hot enough to volatilise these heavy metals, and if Saturn be not made so hot as to drive off hydrogen. Another complication arises out of the attractive effect of the very different masses of the stars. Thus theoretically, the height of the Earth's atmosphere should be about 27·5 kilometers or 17 miles, and if the Sun's temperature were the same as ours, its atmosphere would be only 1 kilometer high or $\frac{2}{3}$rd mile. Seeing that its temperature is perhaps 10,000° C. or 35 times hotter than that of the Earth measured in the absolute scale, its atmosphere, if like ours, would be 35 kilometers or 22 miles high. If of hydrogen it would be 320 miles high. The densities of stellar atmospheres are unaffected by their temperatures but are believed to affect the widths of the spectrum lines and if so the densities may become measurable.

As yet, such estimates as have been made of the diameters of the various fixed stars, based only on their distances and brightnesses and taking no account even of what is known about their spectra, must be very unreliable, such estimates are however mentioned in the

following table in order to show what is possible in the universe as regards enormous congregations of matter and diversity of composition.

LARGE SINGLE STARS WHOSE DISTANCES ARE KNOWN.

Name of Star.	Parallaxes.	Distances in light years	Magnitudes.	Ratios of diameters to that of sun.	Spectra.	Remarks about diameters, etc.
α Carina (Canopus)	0·01″	540?	−·086	250	(F)	This diameter exceeds earth's orbit. Possibly smaller than stated
β Orionis (Rigel)	0·01	540?	+·034	150	(B8A)	Double star. Probably smaller than stated
α Cygni	0·01	540?	1·33	92	(A2F)	Possibly smaller
β Crucis	0·01	540?	1·50	87	(B1A)	Possibly smaller
γ Cassiopiæ	0·01	540?	2·25	60	(B)	Possibly smaller
α Virginis (Spica)	0·015	220	1·21	39	(B2A)	Possibly smaller
ε Ursæ Maj. (Alioth)	0·016	197	1·68	30	(APec)	Spectrum double. Possibly smaller
α Orionis (Betelgeuse)	0·029	112	0·31	31	(Ma)	Possibly much larger (cold)
α Boötis (Arcturus)	0·034	96	0·24	27	(K)	
ζ Ursæ Maj. (Mizar)	0·016	197	2·09	24	(A)	Double star. Possibly smaller.
α Scorpii (Antares)	0·027	121	1·22	22	(Ma) (A)	Double star. Possibly much larger
β Ursæ Maj. (Merak)	0·016	197	2·44	20	(A)	Possibly smaller
β Centauri	0·036	90	0·86	19	(B1A)	Probably smaller
γ Ursæ Maj. (Pheed)	0·016	197	2·54	19	(A)	Possibly smaller
α Leonis (Regulus)	0·031	105	1·34	18	(B8A)	Probably smaller
α Gruis	0·022	148	2·16	17	(B5A)	Probably smaller
α Eridani (Achernar)	0 047	69	0·60	17	(B5A)	Probably smaller
γ Leonis (Algeiba)	0·020	165	2·30	16	(K)	Double star
α Crucis	0·049	66	1·05	13	(B1A)	Probably smaller
δ Ursæ Maj. (Megnez)	0·016	197	3·44	13	(K25)	Possibly smaller
β Leonis (Denebola)	0·029	112	2·23	13	(A2F)	Double star. Possibly smaller

The table contains amongst other things the diameters of a few of the largest stars estimated from their brightnesses and probable distances. The details about the far-off stars are, of course, unreliable, Canopus, for instance, may easily be twice as near and therefore only half the diameter stated or it may be very much further away and very much larger. A comparison of the spectra with those of the previous table will suggest that a material reduction in some cases to below one-tenth may be permissible. Other stars, for instance, Betelgeuse and Antares, which are comparatively cold, are perhaps much larger than estimated.

There are five double stars in the above list but relative movements of the components have not yet been detected. This fact limits the masses, and to a certain extent, the diameters of these stars, making Rigel less than 14 times the Sun's diameter, Mizar and Algeiba less than 6 Sun diameters, and Denebola less than $2\frac{1}{2}$ Sun diameters. With one exception this is fair agreement with the diameters as modified by remarks in the last column from a consideration of the spectra. Therefore, with some amount of confidence one may say that there are about 12 stars within measurable distance of the Sun exceeding its diameter five times and its volume and mass 125 times. Also that there are five within measurable distance which are about 20 times larger than the Sun, or about 8,000 times heavier, and that Canopus, heading the list, even if reduced to a tenth of its estimated size, is 25 times as large as the Sun and possibly even much more than 16,000 times as heavy. The contemplation of such an enormous mass may well take one's breath away, but there is no reason why these congregations of masses should not be possible amongst the millions of stars which surround us. Even in our little planetary system a great diversity is found. There are a fair number of Satellites, mostly smaller than the Moon, say 2,000 miles diameter; then there is Jupiter and the Sun who are respectively about

40 times and 400 times larger and respectively about 64,000 and 64,000,000 times heavier than the planetary satellites. Why should not a similar disproportion exist between our Sun and Canopus?

It is desirable to give a glance at the pigmy suns, namely: those which it is believed are smaller than Jupiter. Here too, as in the last table, the diameters are estimated from the brightnesses and distances, but unfortunately no corrections are possible because being very faint, the spectra of these stars have not been photographed. The Earth's diameter is 12,742 kilometers, that of Jupiter is ten times as large, that of the Moon 3,450 kilometers.

TABLE OF SMALL SINGLE STARS.

Star Names.	Parallaxes.	Distances in Light Years.	Magnitudes.	Diameters estimated from Brightnesses Kilometers
Krueger 60 (Companion)	0·271	12	11·0	8,300
O A 18609	0·35	9	8·9	35,000
Σ 2398 (Companion).....	0·292	11	9·3	35,000
Krueger 60	0·271	12	9·0	50,000
O A 11677	0·27	12	9·0	83,000
C Z V H 243	0·319	10	8·5	86,000
O A 17415	0·25	13	9·0	95,000
Σ 2398.....	0·292	11	8·5	98,000
Σ 2298.....	0·353	9	8·2	98,000
LL 21258	0·240	14	8·5	115,000
34 Grombridge	0·307	11	7·9	120,000
LL 21185	0·334	10	7·6	125,000

None of these stars is visible to the naked eye, they have been under close observation by astronomers merely because they have made themselves conspicuous through peculiarities. There is probably a very large number of stars equally faint and equally near which have not

been measured, because attention has not been specially drawn to them amongst the tens of millions of equally faint ones. Confining one's attention, therefore, to stars with known parallaxes it appears that their average distances from each other, at least in the neighbourhood of our Sun, are from nine to ten light years; this is about one hundred billion (10^{14}) kilometers or approximately sixty billions of miles. This means that the space fringed by the few measured outer giants of about 540 light years, may be filled with about one million luminous stars, but of which a large majority, although relatively near, are too far away to be seen even with the help of the largest telescopes and of which the distances of only one hundred have been measured.

In order to obtain a faint idea of the enormous amount of matter existing in the universe, the subject may be looked upon from the point of view, unfortunately rejected by Lord Kelvin, that matter extends into infinite space. If matter extends into infinity and if all stars were as bright as the Sun, then the whole sky should be as bright as the Sun. As this is not the case, there would seem to be a very large proportion of dark screening matter. Now it has been found by weighing raindrops which fall during a single shower that they are not all of one size, but that their weights stand in the relation 1, 2, 4, 8, 16. Occasionally drops occur having the weights 1, 3, 6, 12, but multiples of 5, 7, etc., do not occur. It, therefore, seems as if small particles at least combined in pairs, and one may, as a starting point, assume that this happens with cosmic dust.

Imagine that two or more stars have clashed together, and have been converted into a gas which cooled on expanding and by radiation and resulted in a dust, and also that the microscopic particles of cosmic dust thus formed, have combined in pairs and these again in pairs. Then for every cosmic flake weighing, say 1 gram,

one would expect to find two weighing half a gram, four weighing one quarter gram, etc.

The total weight of each lot would be the same, but the disc areas, the screening powers would increase from 1 for the single heavy flake, to 1·25, 1·59, 2, 2·5, etc., for the larger number of smaller flakes. Everybody has, of course, heard of the task mentioned in the "Arabian Nights" of someone having to place one grain of corn on the first square of a chess board, two on the next, etc., up to 64, and that the number soon grew to be so great as to demonstrate the hopelessness of carrying out the task. The total weight, taking 480 grains to the ounce is, in fact, just about one billion tons. This is as much grain as is consumed by the people of this world in from ten to twenty years. One may, therefore, expect that the screening effect of cosmic dust, meteorites, small and large dark stars, which it is here presumed exist in space, will be enormous and may account for the sky at night being as dark as it is instead of shining like the sun.

Before attempting to estimate the relative proportion of bright stars to dark matter or rather to its screening effect, the possibility of certain limiting conditions will have to be considered. There is no reason why stars should not be enormously large, and Canopus, as already mentioned, may be much more than sixteen thousand times heavier than the Sun. One might look on this star as fixing an upper limit, but it is safer to select some intervening size as a starting point and to assume that the largest stars are only ten million kilometers in diameter or seven times the Sun's diameter.

As regards the small luminous stars one finds in the table of pigmies twelve which are smaller than Jupiter, and one of these is even much smaller than the Earth, and not much larger than the moon. Now the only means of making a dark star luminous is either by bringing it into collision with another one, or by plunging it into a cloud

of meteoric dust, the velocity with which it is struck producing the heat necessary for incandescence.

The sun's temperature can with reasonable certainty now be set down as being above 6,000° C, or twice as high as that of the electric arc. Stars of the Orion (B) type are believed to be much hotter. One may, therefore, take 8,000° C absolute, as being an upper limit of temperature for bright stars, and 1,000° C absolute, which is the temperature for a red heat, as the limit below which stars are too dull to be seen.

If, by collision, a star's temperature be raised to 8,000° C, then as the conditions of attraction which cause the high striking velocity must be fulfilled, the minimum diameter of the finished star can be calculated and the following values are obtained:—

A fluid hydrogen sphere should be 70,000 kilometers diameter.
A fluid nitrogen sphere should be 5,900 kilometers diameter.
A magnesium sphere should be 3,000 kilometers diameter.
An iron sphere should be 930 kilometers diameter.
A lead sphere should be 410 kilometers diameter.

For comparison's sake it may here be mentioned that the Earth's diameter is 12,742 kilometers, that of the Moon 3,450 kilometers, and that of the Sun 1,383,000 kilometers.

The mass of a large star as compared with its surface is larger than that of a small star compared with its surface, and therefore the latter will cool more quickly than the former in the ratio of the respective diameters. This, however, is true only for relatively small spheres. For large diameter stars the heat produced by shrinkage is relatively great if they are fluid, when it will be found that, to the luminosity period mentioned above, another portion

depending on the cubes of the diameters has to be added. This refinement has, however, not been introduced into the calculations.

If one could feel sure that every star commenced its luminous life at an intense white heat and gradually grew dull red and then died out, the above information would be a correct basis on which to make the estimate, but it is quite evident that the collisions will not always be between two bodies of equal size. Of course, the larger spheres will be more frequently struck than small ones, but not by their equals. The heat produced is proportional to the square of the diameter of the enlarged star, but then the radiating surfaces are also proportional to the square of the diameter, and therefore the luminous periods will be proportional only to the diameters.

If as assumed there are two million stars of one mass for every one million stars of double that mass, then it can easily be shown that on account of the relatively shorter lives of the small stars, these, although they have a larger combined surface than the fewer large ones, will in the aggregate give out only as much light as the latter. Assuming therefore that the largest luminous star is 10 million kilometers in diameter, or about seven times the sun's diameter, and assuming that the smallest luminous star is 1,000 kilometers diameter then the former would have to be halved 50 times in succession to reduce its mass to that of the latter, and the total light given out by all those stars which have not become dark is equal to that of 50 of the larger stars. There will, of course, be a larger number of large dark stars, meteorites, flakes, and dust, which have never been luminous and which will have a strong screening effect, hiding some stars entirely and darkening others.

It is well known that if bright and dark particles are mixed together, the average brightness in terms of the brightness or whiteness of the one lot, is the ratio of the sums of their superficial areas. Distances which separate

them do not affect the shade. Lamp-black and Chinese white mixed together in a definite proportion result in a definite grey hue, which is not affected by dilution with water. This experience reduces the brightness calculation to a very simple one. Assuming again that the largest star is ten million kilometers diameter, and that the smallest dust particles in the universe are no larger than one-thousandth of a millimeter, or one twenty-five thousandth of an inch, constituting in fact an impalpable powder, then the large sun would have to be halved 160 times in succession to bring it down to this small size. The sum of the surfaces of all the dark particles compared with that of the shining stars is then easily found to be 750 billions ($7{\cdot}5.10^{14}$), and therefore the brightness of the average star's surface, which may be taken to equal that of our sun, should be 750 billion times that of the starlit sky when there is no moon.

It has been estimated that the total light of all the visible bright stars is about equal to the light of 50 million stars of the 13th magnitude. It is also known that the stellar magnitude of the sun is about minus 26·4 to 26·8, or 39·4 to 39·8 magnitudes brighter than a thirteenth magnitude star, and as the light from the stars is spread over the whole sky while that of the sun emanates only from its disc, which measures about one half degree in diameter, it can easily be shown that the light from the sun's surface is from 260 to 650 billion times greater than that of the starlit sky. This disproportion is in such striking agreement with the above estimate of 750 billions that even if it does not prove that the assumptions made are correct, it must at any rate be taken as a strong argument in its favour, which is that there is a possibility that matter is distributed throughout infinite space and that the darkness of the sky is not due to absence of bright stars but to the presence of dark matter. This is confirmed by dark markings across some bright nebulæ, lengthy clouds or arms of relative darkness or paucity of

stars, and about thirty starless fields, in which even the strongest telescopes can discover no speck of light. These are probably clouds of dark matter.

It was difficult for man, who from childhood has been taught to look on himself as the centre of creation, to realise that he is little better than a microbe on the surface of the earth, and few, even amongst scientific men, can wipe out the memory of the biblical sketch of the world which gives primary importance to the dry land and the waters and refers to the stars in an off hand way with the words: "He made the stars also." In comparatively recent years, but long before the most important of physical laws had been discovered, the Kant-Laplace cosmogony was pressed on mankind, not by its authors, who did little more than mention this possibility, but by men who felt that the literal acceptance of a biblical narrative had been, and might still be, a bar to scientific progress, and in scientific circles there now exists, what might be called a popular faith, that the solar system and probably all stars have been produced as suggested by Kant and Laplace, by a cooling of nebulæ. More recently some astronomers believe that these systems owe their existence to a contraction of clouds of meteorites which, as it seems, are believed to be small hard pellets. How, it may fairly be asked, have these pellets been created? If at one time they were vapour which condensed into dust and which in turn conglomerated into flakes, then there would be no possible means of heating them sufficiently to cause them to stick together and form pellets. There must therefore either be an interstellar gaseous atmosphere having a very high temperature indeed, a condition which perhaps exists in the Great Nebula of Orion, which the spectroscope shows to be incandescent hydrogen, or else the cosmic flakes must have passed close to a very hot sun whose radiation heated them to melting point. These possibilities cannot be rejected but do not, one may feel absolutely certain, apply generally to all parts of space. It may,

therefore, be expected that, generally speaking, cosmic matter exists, not as pellets but as flakes, and that these are limited as regards size. This size may one day be determined for various elements by mathematical reasoning, for flakes which hold together by cohesion and not by cementing fluids, must fall to pieces if they have grown so large as to strongly attract each other and collide with relatively high velocities. Generally speaking such flakes, because they cannot have been struck by others at high velocities may be expected to have very slow motions of their own, and are possibly congregated in relatively dense masses and remain stationary in various parts of the universe. On the other hand large stars by mutual attraction or by collisions may have acquired terrific velocities of say 30 to 100 miles per second.

These few remarks about the possible contents of infinite space will already have suggested that the amount of matter out of which the innumerable stars have been built up, is so scarce that if it were converted into a gas and uniformly distributed, none of our most delicate instruments could detect it. At any rate, if we assume that the average distances between large and small luminous stars is nine to ten light years or about 100 billion (10^{14}) kilometers, then the average density, not taking into account any gases, is of the magnitude of about one milligram per 100 kilometers cubed. This density is, however, comparable with the density of meteoric matter which the earth encounters on its path, for it has been estimated that the meteorites which enter our atmosphere are spaced about 500 kilometers apart, and if on an average they weighed 120 milligrams the density of our surrounding space would be about the same as that just mentioned.

In spite of these agreements it is permissible to assume that the adopted subdivision from large stars down to small particles is not as regular a one as has been here

assumed (merely in order to facilitate calculations), and it is more than probable that locally at least the density of matter in space is much greater than here estimated, though near large suns perhaps all matter may have become assimilated or driven away. In order, therefore, to carry the general enquiry to its logical conclusion it will now be assumed that our solar system actually once passed through such a dense meteoric cloud or rather skirted it, so that the meteoric particles will have stepped out, as it were, to meet our sun and will have circled round our system in hyperbolic paths, whose elements would be fixed by the solar velocity, say 20 kilometers per second. Some of these particles would strike the sun and planets, while others would get entangled in the system with the following result.

No matter what the former angular position of the plane of the ecliptic and of the equatorial plane of the sun may once have been, the meteoric bombardment, if the sun were moving towards the edge of the dark cloud, would rapidly tilt both planes into harmony with the average direction of the bombardment, but the orbits of the satellites of the outer planets and also the equatorial planes of the smaller planets would hardly be affected. The large tilt of the orbits of the satellites of Uranus and Neptune, may therefore be accounted for by assuming that the ecliptic was once tilted as much as these are now, though not parallel to the present planes of these small orbits.

Another effect would be, that after the planetary orbits had been tilted, the meteoric bombardment of the planets, and also certain re-actions would rapidly enlarge these orbits. Thus, Jupiter may once have occupied the position of Mercury but was forced to travel outwards, and possibly some other planets, especially if they were large or even comparable to our sun, have separated themselves entirely from us, and may now be travelling in space in the same direction as we are, either as dark or as bright

suns accompanied by planets which formerly were mere satellites. This may perhaps explain the origin of stellar drifts, and account for the two dozen conspicuous suns which seem to be moving in the same direction as our sun.

Another and very important effect of the bombardment would be the heating up of the sun. Provided that the meteoric cloud was dense enough, sufficient heat would be generated by the bombardment to volatilise a large part of the comparatively light materials of the sun and of the added matter and to create a huge incandescent atmosphere, extending possibly beyond the Asteroids. Perhaps no inner planets existed before the sun skirted this meteoric cloud, but there can be no doubt that very soon innumerable meteoric particles, which by the perturbing influence of the outer planets got entangled in our system, would circulate round the sun as do the particles which constitute Saturn's rings, and would to this day be circulating as particles, had not the solar ones been subjected to the intense heat of the then existing solar atmosphere, and melted, for flakes or hard particles cannot stick together when they touch as molten drops do. Of course as Jupiter would draw off a large number of particles there would be relatively few between his orbit and that of Mars, and even if the sun's incandescent atmosphere enveloped all these particles and melted them, their collisions would be comparatively few.

The attempts which these molten drops may be said to have made to come together to form one or two or three planets seem to have been nipped in the bud as soon as the sun emerged out of the meteoric cloud, for then the bombardment would cease and no further heat supply would be available for making good the enormous radiation of the large incandescent solar atmosphere, and that would rapidly shrink and leave a number of half-formed Asteroids in the cold. These may still occasionally collide, but being hard they will rebound and part company.

The molten drops in the inner portion of the solar ring

have had a better chance of forming planets, partly because there appears to have been plenty of material available, and partly because this region remained hot for a relatively long time.*

If, however, this view be correct, then one might expect that the perturbing influence of the outer planets, especially of Jupiter, on the inner particles or molten drops, would be of a definite character, and that seems to have been the case. The perturbing effect of an outer planet is greatest on such inner planets or particles as have periods of revolution of 1/2, 1/3, 1/4, 1/6, 1/8, 1/12, etc., of their own, which means that whereas other particles would revolve round the sun in circular orbits, those whose periods harmonise would occasionally be forced to revolve in elliptical orbits, and they would then come in contact both with such particles as have larger and such as have smaller orbits than themselves. They would gather these up and gradually form large planets. According to Croll the eccentricity of the earth's orbit was so great, only 800,000 years ago, as to bring us half way to Venus. Of course, if the density of the supposed solar ring were irregular, as is still the case with Saturn's rings, the natural periods mentioned above would be somewhat modified according as to whether more or less matter was found within or beyond the perturbed particles' orbits, and then too as the inner planets grew in size they would

* The preceding remarks about the effects of a meteoric bombardment are based on calculations which, although very simple in principle, are too voluminous for publication. The remarks which here follow, on the periods of revolutions of the planets, etc., are based on a paper read by me before the Manchester Literary and Philosophical Society in 1910, about which the minutes of the Society record only that it was ordered to be printed and that it was withdrawn at my request. As the last remark may give a wrong impression, it is desirable here to mention that the request was made in order to oblige the President who seemed to have to contend with difficulties similar to those which subsequently arose with one of the members about Sir Thomas H. Holland's lecture as reported in the proceedings.—C.E.S.

produce perturbing effects on each other. That some influence of the above sketched nature has been at work will be evident from the following table:—

PERIODS OF REVOLUTION OF JUPITER AND THE INNER PLANETS.

Planets ...	Jupiter.	Vesta.	Mars.	Earth.	Venus.	Mercury.
Periods ...	4322·6 d.	1277 d.	686·98 d.	365·26 d.	224·7 d.	87·97 d.
Ratios ...	48	14·2	7·6	4·05	2·5	0·98
Progressions	48	12 or 16	8	4	2 or 3	1

Vesta has merely been chosen to represent one of several Asteroid planets which might, under favourable conditions, have been formed out of the Asteroids. Their periods should have been 12, 16 or 24 in the above table instead of 14·2. Mars should have had a period of 8, and Venus should have had a period either of 2 or 3. It is not at all improbable that our moon was at one time a sister planet to Venus, an arrangement which occurs amongst Saturn's satellites, and that the two formed a pair having a period of one-sixteenth of Jupiter's, viz., 2·5 for Venus and 3·5 for the moon.

If the outer planets have been formed by a similar process, (but during very much more remote times,) they may once have had periods of revolution which harmonised amongst themselves, but this arrangement would be changed when the sun was subjected to the above mentioned bombardment, for under its influence the larger planets, such as Jupiter, would increase the sizes of their orbits more rapidly than the smaller ones, and it is therefore perhaps a mere coincidence, but an interesting one, that the relative periods of the outer planets should be practically the same as those of the inner planets, except that it seems as if one planet between Saturn and Uranus were missing. This will be seen from the following table:—

Relative Periods of Inner and Outer Planets.

Inner Planets.

Names	Mercury.	Venus.	Earth.	Mars.	Vesta.
Relative Periods.	0·98	2·5	4·05	7·6	14·2

Outer Planets.

Names	Jupiter.	Saturn.	—	Uranus.	Neptune.
Relative Periods.	1·00	2·5	—	7·1	13·9

It will naturally be urged that if the planets have been formed as sketched above, then their satellites should have been formed in the same way, except that, as in their cases there would be no outer satellites, the perturbations initiated by an outside influence will have become mutual. Then also if there were no incandescent atmosphere, the materials of which the satellites were built up must have been of such a nature as to remain fluid at very low temperatures: for instance, hydrogen, oxygen, nitrogen, etc. Now an examination of the following tables shows that for the satellites the same relations exist amongst their periods as amongst those of the planets, except that the ratio 3/2 occurs rather frequently.

Jupiter's Satellites.

Numerals ...	V.	...	I.	II.	III.	IV.	...	...	...	VI. & VII.
Relative Periods...	1·12	...	4·0	8.02	16·20	37·8	...	...	...	577
Progression..	1	2	4	8	16	32	64	128	256	512

Saturn's Satellites.

Names.	Mimas	Enceladas	Thetis	Dione	Rhea	...	Titan	Hyperion	...	Japetus
Relative Periods...	2	2·9	2	2·9	...	...	2	2·27	...	...
Mean relative Periods...	1		2·0		3·91	...	15·1		...	68·6
Progression ...	1		2		4	8	16		32	64

SATELLITES OF URANUS.

Names	Ariel.	Umbriel.	Titania.	Oberon.
Relative periods	2	3·3	—	—
Mean relative periods	1		2·6	4·04
Progression	1		2 or 3	4

Another argument in favour of the above sketched view about the Solar system can be based on the fact that with the two exceptions of Jupiter's VIII and Saturn's Phœbe, which have retrogade motions and which are probably captures and not mentioned in the above tables, all satellites revolve round their primaries in one and the same sense; and also that, except in the case of Uranus and Neptune, for reasons already given, the satellites revolve in the same sense as the planets revolve round the sun. Those planets of which the rotations are known also rotate in the same sense. If, as suggested by Kant and Laplace, the planets and satellites had been formed by the breaking up of solar discs or rings, then the rotations ought to have been in the contrary direction to the revolutions, for the inner particles of a disc or ring move faster than the outer ones. If, however, the planets have been formed by the sweeping-up process of expanding ellipses, as explained above, then the planets ought to rotate as they do, and their satellites ought to revolve exactly as they are found to do.

It has already been suggested that our outer planets existed before the inner ones, but then, if they too have been formed by the above sketched process, though in a remote region of the universe it must have contained abundance of light material like that in the great hydrogen nebula of Orion. This would account for the marked difference of densities of the materials of the outer and inner planets, which are detailed in the following table:—

Densities of Sun and Planets.

Old Solar System.

Names	Sun	Jupiter	Saturn	Uranus	Neptune
Density.....	1·38	1·33	0·72	0·94	0·88

Young Solar System.

Names	—	Mercury	Venus	Earth	Mars
Density.....	—	6·22	5·80	5·53	3·9

If it be assumed that, during our comparatively recent bombardment, the Sun received say 10 % of heavy matter of 6·0 density, then its original density will have been 0·92, bringing it quite into harmony with that of the outer planets. Jupiter may also have had a small fraction added to its density. For the sake of comparison the densities of a few light substances are here given. Fluid hydrogen 0·09, methane 0·41, solid lithium 0·59, sulphuretted hydrogen 0·86, potassium 0·87, cyanogen 0·87, sodium 0·98, water 1·00, fluid nitrogen 1·03, oxygen 1·42, chlorine 1·50, hydrochloric acid 1·50.

One will naturally wish to look back towards the region of the meteoric cloud through which the solar system may have passed, but this is not easily indicated because the present direction of our path is determined by averaging the movements of fixed stars which are travelling in many directions and their average motion is not necessarily the motion of the meteoric cloud. Then also our path is not necessarily either straight or circular. If, however, a circular path be assumed, and if it be remembered that after emerging out of the cloud the direction of the sun's motion must at first have been parallel to the ecliptic, then two regions in the sky can be fixed upon where the

meteoric cloud may have been stationed. The one is situated a little south of Orion at about 90° R.A., 16° S, and the other region is near γ Persei, at about 45° R.A. and 50° N, and the centre of our orbit should be looked for in Auriga near 100° R.A., 35° N. The two dozen fairly conspicuous stars which are said to be moving in the same direction as our sun, and possibly many more but fainter ones, may once have been partners of our sun. Does it not appear as if they too had passed through the same vast cosmic cloud through which we have passed, and that they too have there increased their weights and heat and are now entering on a period in which their planets are cooling down until conditions favourable to life are created?

The conclusions which can now be drawn from the various enquiries of this chapter are that the amount of Matter in the Universe is infinite, that the average quantity of Matter in a unit of volume is much less than that of the most perfect artificial vacuum, but that this quantity is in a sense measurable. There is also every probability that the matter which is distributed through space varies vastly as regards quality; the spectra of molten suns and incandescent nebulæ indicate this and the differences in the constitutions of our planets prove, almost without a doubt, that our solar system has passed through two regions, the one full of light matter out of which the sun and outer planets were built up and the other full of heavy matter out of which the inner planets were formed.

ENERGY.

HAVING briefly reviewed some details of Matter, the sluggish partner of life's dualism, attention has to be directed to Energy, the life-partner of Matter. One's first feeling is to say that the nature of human energy is known, for having exerted oneself and expended energy there is a feeling that the work done cannot be undone without renewed exertion. If a stone be thrown high up into the air it can smash something when it falls. This generalisation has soon to be modified, for if energy be expended by walking or running in a circle there is nothing to show for the work done. For a long time, therefore, energy was looked upon as being something that could be produced and could disappear again. The first man to discover its indestructibility by pointing out that its nature is changeable, was Dr. Karl Friedrich Mohr, an apothecary who, in 1837, published a paper on the "Nature of Heat." He refers to Force, the word Energy having not yet been applied, as being capable of appearing according to circumstances either as motion, chemical affinity, cohesion, electricity, light and magnetism, and that from one of these forms it could be transformed into any of the others. This paper passed almost unheeded, but the idea of the Conservation of Energy seems to have been in the air and several men, notably Joule, a Manchester manufacturer and amateur scientist, established the fact that 772 foot pounds of energy are equal to the quantity of heat which will raise the temperature of one pound of water by one degree Fah. Here was a discovery: heat and energy were found to be the same thing! The old idea of heat being one of the chemical elements called phlogiston died hard, but seeing that the

whole framework of physical and chemical sciences rests on the truth of Mohr's statement or its modern equivalent, and would fall to pieces if disproved, one may feel assured that the discovery first made in the middle of the last century is true. Energy, like matter, is indestructible, but its nature can be changed.

In a certain sense, Newton had proved this point, but only as regards the lower manifestations of energy; he showed that work, potential energy, kinetic energy, *vis viva*, etc., were one and the same thing. These are the forms in which energy appears in the movements of the stars.

Energy cannot be seen or felt, nor has it been defined. It can be measured but never in fewer than two units. Even some of these are beyond our comprehension. Thus energy is measured in feet and pounds, or in any other multiple of distance and force. Supposing that a heavy swing is pushed with a pressure of twenty pounds, and supposing that thereby the swing is moved through a distance of four feet in the direction of the push, then one has done $20 \times 4 = 80$ foot pounds of work, and has imparted 80 foot pounds of energy to the swing. If the swing were to be tied up to the point to which it has been pushed one would have a form of energy called potential energy. Releasing the swing it flies back and past its lowest position with a certain velocity. In this guise one has kinetic energy, or *vis viva*. Whenever the swing comes to rest again in its highest position it once more represents potential energy. Thus a swinging swing, or a pendulum represents a succession of changes of energy from the potential to the kinetic and back.

It is desirable here to give a word of warning as regards the mathematical expressions, multiplication and division as applied to energy. These expressions are conveniences, but they are also misleading. For instance, work is the product of force into distance, and conversely force is energy divided by distance. This is the mathematical

way of saying that if a certain amount of energy, represented say in the case of pile driving by a falling tup, drives it downward through a certain distance, then the force which is doing this work existed at the contact, and can be ascertained by dividing the acquired and disappearing *vis viva* of the tup by the movement of the pile. This example may appear relatively clumsy, but it is perhaps clearer than the mathematical expression used above. Even in the simple case of the tied-up swing there is no clear definition in the mathematical expression for the potential energy. It is necessary to fall back on the compound foot pounds, and it is quite impossible to say where the potential energy really is. The same difficulty applies to a weight which has been lifted from the ground to an elevated platform. The whole system represents so many foot pounds of potential energy, for if the stone were to fall down it would reveal a definite power or energy for smashing something. Supposing, however, that the platform were surrounded by a rampart or guard, then mathematically speaking nothing is changed, the system still represents so many foot pounds of potential energy, but before this energy can develop itself, additional energy will have to be applied to lift the stone over the obstructing guard and this addition will reappear in the fall. Where is the energy? In the stone? In the platform? Or in the lower level? This difficulty of expressing energy with mathematical precision will make itself felt more and more as higher forms of energy are discussed. But two conditions to which energy is tied seem to stand out clearly, the one being that it can lead no independent existence but is always chained to matter, and the other is that it is always associated with two or more material objects, even if they are only atoms or electrons, and never with only a single one. This may perhaps prove to be the key with which the mystery of so many dualisms of life, including our own inner and outer world, and even the sexual dualisms might be unlocked.

Energy has never yet been defined; it is only by its manifestations that it is known. Mathematically speaking, energy has to be divided by one of its manifestations and then another manifestation is revealed, but not the essence of energy.

The following are some of energy's simplest manifestations: energy is the product of distance into force, of volume into hydrostatic pressure or stress, of velocity squared into mass.

Animals, with the help of their organic constitution, convert the chemical energy of food into mechanical energy. The rate at which this is done is called power. One horse power is 550 foot pounds, or one quarter foot ton of energy produced in one second, therefore, mathematically speaking, power is energy divided by time. The *vis viva* of a one pound bullet travelling at the rate of 2,000 feet per second is about 64,000 foot pounds, which is equal to the work which a horse could do in about two minutes. If this bullet had been a meteorite, reaching us from an infinite distance, its velocity would have been about 30 miles per second, and its *vis viva* about 500 million foot pounds, which would be equal to the work which six horses could do if labouring for a week of say 50 hours. The one pound meteorite looks the same as it would do if stationary, yet as it is moving in relation to the Earth, it represents the enormous amount of energy just mentioned. Even in this simple example we see how difficult it is to grasp the nature of energy.

The sun is supposed to be moving through space with a velocity approximately equal to 15 miles a second, and many fixed stars are known to be moving still faster. What an infinite amount of energy this represents! One might be tempted to make an estimate, as was done with Matter, as to the total amount in the Universe, or its average distribution in space, but the difficulties are too great. Either all the stars would have to be placed at rest and their energy converted into heat, or all the

heat they contain would have to be added to their *vis viva*. No data are available for doing this.

In spite of these difficulties it is at least desirable to obtain some insight into the nature of energy. Consider the simple case of a man playing billiards. His arm does work on the cue, to which it imparts velocity, and therefore also *vis viva* or energy, the cue is energetically driven forward, and if liberated from the hand would fly away like a spear or as if possessed by an evil spirit. Suddenly the cue comes to rest, for it has struck a billiard ball, the evil spirit seems to have disappeared, but no! it has passed into the billiard ball which now flies off like one possessed across the table and bounds from cushion to cushion. Apparently the restless spirit, energy or *vis viva*, has little longing to be transferred to the heavy table, and yet, it seems to wish to be liberated from the ball, from the inert mass to which it is tied. Suddenly the moving ball strikes another one at rest, and as suddenly all the energy passes from the one to the other which in its turn shoots madly about.

During the short intervals of contact the *vis viva* is changed into potential energy, which manifests itself as compression or flattening and pressure between the two balls, but this potential energy is at once re-converted into *vis viva*. The reason why, if left alone, a ball comes slowly to rest, why it loses the energy imparted to it by the player, is that it is doing frictional work, is losing energy to the table while it rolls on it and while it displaces the air. This frictional work is changed into heat which dissipates and is practically, though not really, lost.

In this simple example one sees that although matter, in this case the cue or the ball, can be at rest or moving, can be possessed by energy or free from it, energy does not seem able to liberate itself from matter. It acts as if it wished to be free from the particular matter to which it is for the time being attached, but in the act of escaping

from one material object it seems to be forced to plunge into another.

The behaviour of energy when a ball meets the cushion is also interesting. Here, too, the *vis viva* or kinetic energy is instantaneously converted into pressure and stress, which is potential energy, but it does not seem to like its new abode in the cushion, as if it disliked its massiveness, and without any hesitation the restless spirit re-enters the billiard ball which has now come to rest, and at once flies madly away with it. It comes in contact with the nap of the table cloth and imparts itself to these light objects; it also transforms itself to the light medium (air) through which it moves, and in doing so it changes itself into heat and thereby acquires the ability of moving away with the velocity of light. From the enormity of the velocity with which energy as heat moves through space, one gathers that its new medium is even lighter than air. Scientists call it ether.

The idea that energy has a desire, or consists of a desire, to be free from matter is but a crude one, but it has this advantage, that it is simple. However, for convenience of dealing with more complicated natural phenomena it is perhaps better to say that energy has a strong tendency to change its manifestations towards more and more specialised forms, the complexity or incomprehensibility increasing as it were the smaller the proportion of matter to energy.

Heat Energy.

If a piece of lead be placed on an anvil or on a heavy stone, and belaboured well with a hammer, it will if touched feel very warm. Here human energy has been converted into kinetic energy in the hammer, to potential energy as pressure between the hammer and the lead, and lastly into heat which shows itself by raising the temperature of the piece of lead.

The reason why lead should be used for this experiment

is that it has a low specific heat, which means that a small amount of heat will raise its temperature considerably. The same amount of heat for instance which will raise the temperature of one pound of water 1° Fah. will raise that of lead as much as 32° Fah. Heat is not the same thing as temperature. Heat is energy, temperature is heat or energy distributed in matter. Mathematicians would say divided by matter, but it is doubtless more correct to say that temperature is heat divided by some property of matter. Here a strange relation previously referred to turns up again. Energy and heat are, as proved, identical. If one divides (mathematically speaking) energy (in this case *vis viva*) by mass, or by the inertia of matter, one obtains a velocity squared, a something whose meaning cannot easily be grasped. If one divides energy (in this case heat) by mass or by the heat retaining property of matter, temperature is obtained, yet temperature and the square of a velocity are surely not one and the same thing. Apparently they stand to each other in the same relation as the inertia property of matter stands to the heat retaining power of matter. This latter factor has received the name of entropy, but it is after all only a name, though one which has proved of great convenience in mathematical discussion of heat and work.

The heat which warms materials and which is tied to them has many peculiarities; one of these is that it leaves them as soon as it finds others that have lower temperatures. If a pound of water be placed in contact with a pound of lead and a certain quantity of heat be imparted to these, $^{31}/_{32}$ would go to the water and only $^{1}/_{32}$ would go to the lead. If we could change the specific heats we should alter the ratio. This changing of specific heats is in a way done in all steam, gas and vapour engines, and is the means of producing power from the heat which was generated by the combustion of fuel, for vapours vary their specific heats according to the change in their volumes or pressures. Another property of heat is that

it radiates into space. Radiant heat, and also light are believed to be electric waves, and identical with, but much finer than the electric waves of wireless telegraphy. That question need not be discussed here, but it is of importance to note that, ever since the theory of the conservation of energy has been established, physicists have unconsciously accepted the view that electricity, radiant heat and light cannot move through interstellar space, which they assume to be matterless, and they have therefore filled it with a mythical substance, by some believed to be a solid, and have called it "ether." Recently discovered peculiarities about aberration have shaken this view considerably, and if, as seems probable, all solids and fluids are volatile at all temperatures, even at absolute zero, then there is little need for the presence of ether. Possibly at no distant date the view may find credence that interstellar space is filled with highly attenuated gases, possibly of considerable temperatures, at any rate, the vast region of the great nebula in Orion which it would take millions of years for our sun to traverse even at the rate of 15 miles per second must be incandescent gas. Then too some recent experiences according to which a perfect vacuum is a good non-conveyer of heat and of electricity seem to imply that radiant heat if not light also, requires a material medium for its transmission.

Electric Energy.

Electricity too is a manifestation of energy, but so highly specialised, particularly in its magnetic manifestations, that none of our senses seem capable of perceiving it. Thus if a person step on a sheet of glass, which is a good non-conductor, he may safely allow himself to be charged with as much electricity as would produce a spark strong enough to break through the glass plate and yet he would feel nothing. He may also lay his hands

on an electro-magnet which is exerting an attraction that could pull nails out of wood, and again he feels absolutely nothing. In both cases he occupies regions in which there are powerful accumulations of energy, but he does not feel or see them. Strange to say human beings do not even feel electric currents that may be passing through them, but they do feel, and may die of, changes of intensity. Why is this insensibility? Perhaps we ought to have a sixth sense, perhaps it is as well that there are only five, for human beings might suffer with each magnetic storm and might get out of order as much as a watch does when it is placed near a dynamo. At any rate even a sixth sense would not help towards our understanding what electricity is, for in spite of eyes the nature of light remains a mystery, nor do our hands tell us what force is. Some people profess to feel the approach of thunderstorms and playing with Tesla discharges makes one abnormally sleepy and Röntgen rays sterilise, but these are vague effects not real perceptions as by a sixth sense.

However, a few things are known about electricity. There are two kinds, one positive, one negative, and these attract each other. If regions of positive and negative electricity are connected by means of a wire, metal being a good conductor, these two electricities flow together, and this flowing is called an electric current. This current warms the wire and if the wire be coiled, magnetic effects are produced. If the wire be cut and the ends immersed in a fluid electro-chemical effects are the result. If the wire be laid alongside another wire, induced electric currents are produced.

A point of great importance is that mathematicians can accurately estimate all these manifestations of electric energy, and they have thus placed themselves in a position not only of being able to express this energy by numerous complex terms, but the facility thus afforded for looking at electricity from many points of view has made it possible to discover new and most non-natural applications

for electricity such as telegraphy, telephony, power conversion, wireless telegraphy, electro-plating, etc.

At this point it may be as well to glance at the constituents as one might call them of indestructible energy.

Energy or Work is the product of force into distance.

Work is also the product of hydrostatic pressure into volume, and it is (horse) power or electric Watts multiplied by time.

Potential or Static Energy is expressed in the same terms.

Vis-Viva or Kinetic Energy is the product of mass or of the inertia of matter into the square of velocity.

Heat is the product of some imaginary property of matter called entropy into temperature.

Radiant Heat is evidently the product of velocity into something unnamed.

Electric Energy is many inconceivable things, for instance, Ohms, Time and the square of Ampères, also Volts squared, and Time divided by Ohms, etc. Its various factors have been named Volts, Ohms, Ampères, Joules, Watts, Coulombs, Farads, etc. These things are all as real as are physical force or as temperature which can both be felt by our senses, but because we have no electrical sense these somethings can honestly be called incomprehensibles, and one naturally asks will it ever be possible for human beings to grasp their essence.

Chemical Energy.

The difficulty of understanding what scientists mean when they adopt such simple expedients as multiplication and division of things or conditions of which they cannot say what they are, is increased a hundredfold when the sums of addition, which are represented by a string of chemical symbols, are contemplated. Here energy is not tied to matter in general, but to particular forms of matter, to the chemical elements and to their compounds. One

cannot, therefore, talk of chemical energy as one talks of electric energy, because the name of the chemical has to be added, for instance, the chemical energy of chlorine or of oxygen. What is still more confusing is that these energies depend not on the single elements but on those which are reacting on each other. Thus, the chlorine-hydrogen energy is totally different from the chlorine nitrogen energy, in the one case there is great affinity, in the other there is strong antipathy. In all there are about 70 known elements, and thus with the possibility of combining these in pairs, one is brought face to face not with one further manifestation of energy, but with seventy times seventy, and also with the innumerable manifestations of energy compounds of these compounds. All manifestations of energy are, what is commonly called, forces of nature, and except the physical ones: force, gravity, attraction, heat, potential, etc., the rest are nameless, and yet, the chemical affinity of one element for another is as distinct a force of nature as is the mutual attraction of positive and negative electricity, as is gravity, or the attraction of matter and matter, but it is more highly specialised.

Chemical affinity, of the elements for each other, was at one time looked upon as of great importance; not only were the elements said to have longings for each other, but their combinations also thirsted for other combinations, more particularly the acids for the bases. However, during the recent past the mathematical part of chemistry has grown to be a sort of play with symbols, one atom replacing another apparently at the will of the chemist or demonstrator, whereas the fact that one atom will only make way for another if it cannot hold on to its home is taken for granted, and to a certain extent overlooked. More recently, the old idea has again grown in importance because of the researches into the question of heats of combination. These, like the electric potentials of elements, stand in some fairly close relation to chemical

affinities. Thus, bromide has a strong affinity for potassium, and if these two elements are brought together, heat is generated, and the black bromide fluid combines with the silvery potassium to form bromide of potassium, a transparent salt. The heat evolved is called a heat of combination, and for equivalent weights is in this case equal to 190,620 calories. Had potassium and iodine been combined, less heat, viz., 160,260 calories would have been evolved, but the difference, amounting to 30,360 calories, could be evolved if bromine were to be poured on the iodide of potassium, for bromide has a greater affinity for potassium than iodine, and drives it out. Similarly chlorine's heat of combination with potassium and its affinity for that metal is greater than that of iodine, which would be liberated and heat evolved if chlorine were brought in contact with the iodide of potassium salts. There are also negative heats of combination. For instance, chlorine and nitrogen can be chemically united by a roundabout method, but they separate as soon as a trace of any substance having only a weak affinity for chlorine is brought near this compound, then the dissociation is so sudden and so violent that this compound ranks as one of the most unreliable and terrible explosives known. Its discoverer was damaged and many subsequent experimenters killed by it. This substance is of the nature of fulminate of mercury and of silver, substances which separate into their constituents with explosive rapidity when struck or rubbed. A somewhat similar phenomenon is noticed with silver halogens; the combinations are so unstable that on exposure to light the two elements are not exactly liberated but their bonds are loosened, so much so that certain re-agents called developers, which would not otherwise affect them, will now produce changes which, by photographers, are called developments.

If a lead ball be dropped from a height of 772 feet on to a solid foundation it would be found to be

flattened, and, as already mentioned, it would have grown perceptibly hotter to the touch, viz., 32° Fah. If dropped from double the height the increased temperature would be twice as much, viz., 64° Fah. Then seeing that the amount of heat increases with the height of the fall one would be justified in looking on the heat evolved as being a measure of gravity of attraction of the bullet by the earth. Suppose further that the lead ball were lying on a shelf behind a wall and that before it can fall down 772 feet it may have to be lifted say 8 feet over the wall, then of course, the work done due to the lift of 8 feet is not lost, for the total fall is now 780 feet, and the rise of the temperature of the bullet is now 1 per cent. more than before, but 1 per cent. had to be applied during the lift before the fall could take place.

Most chemical processes are similar in nature to the one described. There is a chemical attraction between chemical substances and there is a sort of trigger action required, a slight expenditure of energy being necessary before the reaction takes place. Take the following well known simple case. Mix together seven parts of fine iron filings and four parts of sulphur powder. The two elements have a strong affinity for each other, but from a chemical point of view they are as yet far apart, a wall separates them. If now heat be applied until a dull red temperature is attained, the whole mass will suddenly brighten up, and combination takes place. The iron has disappeared, at least a magnet does not attract the mass, nor is a trace of sulphur to be found; a new substance has been produced called sulphide of iron, well known even to schoolboys, for when moistened with weak acids it gives off noxious vapours.

A more complicated, but also more impressive example of this trigger action is gunpowder. This substance is a mixture of charcoal, saltpetre and sulphur, chemical substances which have great affinities for each other, but their attractions cannot manifest themselves as long as the

grains only lie side by side; they have to be brought into chemical contact, whatever that may be, and this is effected by applying a little heat at one point only, just enough to ignite the sulphur. This starts the reaction, and the pent up energy manifests itself with alarming rapidity, bursting rocks asunder or hurling projectiles with enormous rapidity.

Thousands of similar reactions could be cited, in fact most chemical reactions require the application of heat. This trigger action is not, however, quite as simple as might appear. There are numerous compounds whose elements dissociate when heated and re-combine while cooling, but if mixed together in the cold they do not combine. Apparently an excess of heat converts affinity into antipathy, and it would also seem as if excessive affinity raised barriers against itself, and that combination only takes place when the affinity is somewhat reduced by heating.

Recently, a whole series of so called inert elements, all of them gases, have been discovered; helium, neon, argon, krypton, xenon, etc. With these elements it seems as if the obstructing barrier were so high, that the combining temperature is above the dissociating temperature.

A wall or obstruction of some sort seems also to surround a few chemical compounds whose elements would otherwise separate. Thus chloride of nitrogen which can be produced by a roundabout chemical process is held together by some binding power, but the merest touch with the smallest organic particle severs the tie and the two elements separate with the most violent explosion.

Not only heat but other forms of energy can overcome the reluctance of chemical elements to combine or to separate. Pressure seems to be necessary for the solution by water both of silica, which is a stone, and of carbonic acid, which is a gas. A flame is very much affected by pressure. Pressure will alloy metals and it causes fulminate of mercury, dynamite and gun-cotton to explode.

Hydrogen under pressure reduces many metals from their salts. Light produces similar effects. Thus hydrogen and chlorine may be mixed in the dark without combining, but they form hydrochloric acid if exposed to sunlight. Chloride of silver may be heated till it melts, but sunlight produces a change and blackens it (photography). Electricity, too can be made to split up almost any compound, but in this case the electric energy does the whole work of separation and in doing so disappears until recombination takes place.

Chemical energy is specialised in yet another direction which in recent years has been the cause of very careful and extensive enquiries. It has been discovered that chemicals help each other. This is called catalytic action. The catalytic agent is a broker who assists at combinations and separations, he is not only the marriage broker, but sometimes also the divorce judge. He finds two chemicals in company yet unable to combine, he helps them. In other cases, elements which have been forced together against their will, have to wait for the intermediary before they can separate. Catalytic action is a highly specialised manifestation of energy, for generally the merest trace of the matter which embodies this form of energy is sufficient to bring about stupendous changes. Thus a speck of dust starts the separation of nitrogen chloride. Hydrogen and oxygen may be mixed together in the presence of a wire heated white hot by electricity but they will not combine. Add a trace of a catalytic agent, perhaps moisture, though this is not yet established, and combination with explosive rapidity takes place, even if the wire be only red hot. Similarly, phosphorus and oxygen, which combine almost at any temperature if a trace of moisture (the catalytic agent) be present, will not unite even at a white heat if quite pure.

The first catalytic agent known to chemists was platinum, more particularly platinum sponge. This substance seems to act in a mechanical way but how the

others act is not yet known. It has the power of absorbing gases, amongst others, it absorbs both oxygen and hydrogen, and when these two gases find themselves in juxtaposition in platinum sponge they combine without application of external heat. This principle was made use of by Döbereiner in his well-known igniter before matches had been invented, and is the principle made use of in modern toy gas lighters, which consist of beads of platinum sponge on wire. On a large scale platinum is now used as a catalytic agent for the production of sulphuric acid, and is therefore replacing another catalytic agent, nitrous acid. For many decades sulphuric acid was made by mixing the fumes of burning sulphur with a certain proportion of moist air and adding a trace of nitrous acid, which was the catalytic agent. It had the power of absorbing oxygen from the air and handing it to the sulphurous acid, converting it into sulphuric acid, the nitrous acid remaining unchanged.

All chemical substances capable of acting as intermediaries are called catalytic agents, and are evidently so constituted that their specialised energy produces the above described catalytic reactions, and one may therefore now add catalytic energies to the already overgrown list of manifestations of energy, or forces of nature.

It is interesting to note that catalytic energy is the counterpart of trigger arrangements in mechanics, both exerting or utilising an amount of energy which is very small compared with the energy which is liberated by their meddlesome activity. Catalytic energy is therefore a move in the direction towards which energy seems always to tend, viz., to reduce the amount of matter to which it is tied, to produce a great effect with a minimum amount of sluggish matter, to effect economy.

The specialised energy existing in or associated with any chemical element or any chemical compound, has been looked upon as a distinct force of nature, as distinct as potential energy, *vis viva* or heat, but it has already

been shown that there are distinct types of these forces of nature. Thus all elements have affinities for each other, they have electric influences on each other which may be positive or negative, they have varying heat producing power, etc. But the great similarity of all the manifestations of chemical energy, the unity of the chemical system, cannot be grasped without a knowledge of the Atomic theory, invented about a hundred years ago by John Dalton, a Manchester schoolmaster and amateur scientist. He showed, what all the chemical professors of the day had overlooked, that when chemical elements combine, they do so in definitely determined ratios. The idea is such a natural one that it is surprising that the eminent analysts who then existed did not hit on it, and that they even opposed the new theory. Perhaps this was but natural, for the orthodox method of reporting the results of analyses was to give the constituents in percentages of the whole, whereas Dalton gave it in terms of the individual elements. Thus, if a few elements, oxygen, sulphur, copper, lead, are combined, certain chemical compounds result whose composition is given in the following table in the old form and also in terms of one element only.

	Old Method.		Ratios.	
Sulphurous acid	Sulphur	50%	1	—
	Oxygen	50%	1	—
Sulphuric acid	Sulphur	40%	1	2/3
	Oxygen	60%	$1\frac{1}{2}$	1
Copper oxide	Copper	80%	4	1
	Oxygen	20%	1	1/4
Copper sulphide	Copper	66·7	2	1
	Sulphur	33·3	1	1/2
Litharge	Lead	92·8	13	1
	Oxygen	7·2	1	1/13
Puce coloured oxide ...	Lead	86·6	$6\frac{1}{2}$	1
	Oxygen	13·4	1	2/13
Galena	Lead	86·6	$6\frac{1}{2}$	1
	Sulphur	13·4	1	2/13

The first column of percentages is very confusing, but an examination of the second and third columns of ratios reveal even with the help of these few examples that the elements have certain definite combining ratios. Thus, fixing on oxygen as one, it is clear that wherever it is replaced by sulphur this element has to be provided in double the quantity. One also sees that the respective combining weights of copper and of lead are four times and thirteen times greater than those of oxygen. Water had been analysed in John Dalton's time, hydrogen had already been prepared, and as it combines with 8 parts of oxygen to form water, he fixed on hydrogen as the unit so as to have no fractions, then oxygen would be 8, sulphur 16, etc. Later it was found that the densities of gases are proportional to their atomic weights, since which date the atomic weight of oxygen has been raised to 16, but then instead of assuming as Dalton did that water is a simple compound of hydrogen H, and oxygen O, which used to be written H O, the modern notation is H_2O, which means that two atoms of hydrogen, each weighing one, combine with one atom of oxygen weighing 16. In addition to the discovery about the specific weight of gases, it was found that the specific heats of the elements varied inversely as the atomic weights, and this helped to fix the atomic weights of most of the metals which could not be volatilised.

Gradually a plausible system of atomic weights was built up. It was then found that certain elements having nearly the same atomic weights had almost exactly opposite characteristics, and other elements whose atomic weights differed considerably seemed to be nearly related.

Mendeléeff hit on the happy idea of grouping the elements and thereby discovered his periodic law, which gave an additional means of fixing some as yet doubtful elements.

The subject of Chemical Energy would be very incomplete without a word about crystallisation. This, too, is

a manifestation of energy, a combination of a multitude of forces of nature about which little is known. There are hundreds of systems of crystals and their growths are clearly part and parcel of chemical energy, but they are also influenced by temperature and pressure. Possible crystallisation represents the pinnacle of chemical energy, every force of nature of which the compound could avail itself has been drawn upon to build up the crystal, but the result is stagnation, death. Enormous and most complicated energy may be hidden away in crystals but it manifests itself only as something regular, as something beautiful, the very essence of energy, the restless activity, its striving for liberty is gone. Energy seems here to have overshot its mark, it can tread no further along the chemical path. Crystallisation does not lead to the next highest manifestations of energy, to organic energy. To reach that domain energy has as it were to retrace its steps to the complicated, confusing, and often unstable compounds which are summarised by the expression "Organic chemistry," from that department, with no other guide than its own restless striving to specialise into something higher, energy has manifested itself in a new and wonderful form as organic energy called cell energy.

Organic or Cell Energy.

On reviewing these brief explanations about matter and energy one finds the original propositions fairly well established, that both are indestructible, that matter can exist alone but energy cannot escape from matter. It manifests itself as a tendency to escape but its efforts merely end in its modifying or specialising itself in such a way that it can perhaps effect greater things than before, while tied to less matter. Thus one pound of matter lifted to a height of 772 feet, represents 772 foot pounds of potential energy. This energy converted into heat will warm one pound of water exactly one degree,

but as water can be heated through 180° before it boils one sees that in the form of heat a very much larger amount of energy can be stowed away in one pound of matter than by lifting it to the top of the highest mountain. If more heat is added, say 1,000 calories or 772,000 foot pounds, the water is converted into steam, and in this gaseous substance more energy is held than in the fluid. Now if one goes a step further and enters the wonderful domain of Chemistry and splits up water into its two constituents, hydrogen and oxygen, then this split up condition represents a sort of potential chemical energy of about 9,000 calories of say seven million foot pounds of energy. It is thus seen that this progressive specialisation is steadily tending towards a condition in which energy is tied to less and less matter.

It has also been pointed out that when energy has attained the high point of specialisation called catalytic activity, it manifests itself by utilising the affinities or antipathies of less specialised forms of energy. It assists them in attaining their objects, not its own for it does not change, and it may, therefore, be compared to a marriage broker, or to a leader of nations who fully grasps the longings of his people and directs their activity. Alexander is remembered as the founder of an empire, but he was at first the embodiment of the Greek national thirst for revenge on the Persians. When Alexander wanted to push on to India his people hung back and his expedition was little better than a failure. Thus in his wars with the Persians he was merely a catalytic agent.

Quite different is the case of Caesar, or rather of the Romans. They interfered in the activity of others and forced them to carry out the Roman principle which was relative peace and internal free trade. This interference has its counterpart in organic cell life. The cell grasps the surrounding minerals, fluids, and gases, utilises the heat energy of the sun and produces organic matter endowed with the same highly specialised energy as itself.

The structure of a cell is generally believed to be a fairly simple one, but as there are hundreds of thousands of different types of organisms on this earth, and as there are many different cells in each type, and as the cells of one type will not thrive if transplanted to another type, there must evidently be millions of differently constituted cells. Besides, the functions of cells in different parts of the same organisms are different. Then also it must be remembered that the nature of the activity of the organic cell is so highly specialised that chemists with their thousands of complicated appliances and manipulations have not been able to effect what organic cells do with ease, viz., produce cellulose, starch, sugar, innumerable organic acids, innumerable poisonous and beneficent alkaloids, oils, fats, colours, and scents by the hundreds. Organic cells also build up out of silica, one of the hardest substances, the most minute and complicated frame of diatomacea and radiolaria. Chemists are proud of being able to extract colours, etc., from coal, but it was the organic cell of the geological past which built up the coal measures. This complexity of cell functions points with irresistible logic to a complexity of structure of the organic cell, but a complexity which the best microscopes have not and never can reveal.

The dawn of life is an unsolved mystery but the guess may be hazarded that the first organic substance must have been structureless jellies, and when structure first made its appearance it must have been coarse and only gradually did it grow finer until it dwindled down to less than microscopic dimensions.

The first glimpses of life on this earth are amongst the geological records of the stratified rocks. Apparently, as will be shown later, one half of the present thickness of the earth's crust had been built up before fossils were deposited, but that does not imply that there were no organisms before that date, on the contrary the presence of enormous layers of graphite in the primitive rocks of

Canada and the fact that well defined fossils suddenly made their appearance in large numbers in the Cambrian strata is as good as a proof that the cell had been in full activity for a long time but only perhaps in plants, and not associated with frames, shells or bones. If at that time the cell was nearly structureless there cannot be any hope of ever tracing its early history. It is of course possible that life may again be produced spontaneously, but if the experiment is to be on the lines of the hoary past, beginnings will have to be amongst the grit and sediments obtained from primitive rocks placed under suitable conditions of heat, moisture and saltness, in an atmosphere which as yet contained probably no oxygen. Rapid development is not to be expected, and even if one could watch the progress of creation of life for thousands of years (millions were possibly required before cell life had real stability) it does not follow that the result would be an organic cell as known to us, most likely something totally different would appear.

Seeing that nothing is known about the early history of the cell, and probably never will be, there can be no harm in indulging in a little speculation as to its development, more particularly as to how the two great organic divisions, plants and animals, separated from each other. There can at any rate be little doubt about a relationship. Both sets are built up of cells, both grow, and their methods of increase are as similar as can be. In both kingdoms there is sexual and asexual reproduction, then, too, the seed of the flower and the ova of the animal are nothing more nor less than very large cells, but they differ from these in so far that they cannot develop but die unless they are made complete by the introduction and absorption of the male pollen or spermatozoon.

The feature which chiefly distinguishes animals from plants is that the former can, while the latter cannot, move about at will. Plants as a rule are cell producers, they combine the fluids and minerals of the earth

with the air and utilise the energy of the sun's radiant light to convert them into cells or organic juices, and at the same time they liberate the oxygen which was chemically combined with carbon as carbonic acid. Few if any animals show the least power or capability of producing cells from their mineral surroundings. Animals feed on cells, and consequently are cell destroyers and carbonic acid producers. They do not utilise the energy of the sun's light or heat. Their energy is derived from the destruction of organic cells. Roughly speaking, plants are energy consumers and cell producers, animals are cell consumers and energy producers. That the one should be fixed to the ground and the other, which is capable of producing specialised energy, should be free to move seems but natural.

On looking closer into the life history of a plant, it is found that the above remarks are not strictly true. The majority of plant cells are certainly energy consumers and cell producers, but there are in the same plant many types of cells whose function it is to modify cells, converting them into wood, bark, or leaves, and the function of the cells in flowers seems to be to produce highly specialised reproducing cells. Here cells are consumed in large quantities, carbonic acid gas is given off, as in animals, and the already specialised energy thus locally gained is converted into a still more highly specialised form having reproductive power. It seems marvellous that all the characteristics of a tree should be stowed away in one of its small seeds, but it is really a thousandfold more wonderful that the microscopic pollen should be endowed with all these characteristics. Here then, one has a most highly specialised form of energy tied to a mere speck of matter and yet capable, as may be seen in our coal fields and in our atmosphere, of splitting up billions of tons of carbonic acid into coal and into the oxygen of the air, and thereby binding to the earth an infinite amount of the sun's heat energy.

It is interesting to note that plants are duals, consisting of cell producers and cell consumers and modifiers. Let it for a moment be assumed that the past organisms, the first combinations of cells, consisted only of cell producers. As long as there was plenty of mineral matter, moisture, and carbonic acid, and above all plenty of sunlight, cell producers would be in full activity and in full vigour. At night and in submerged dark regions where no external energy was available their activity would necessarily cease and their vitality decrease. The more hardy ones might adapt themselves to their new surroundings, and utilise the large amount of available cell matter for food. The vigorous cells would be likely to absorb the weaker ones; they would grow in size and then split up as is their nature, and as they had always been accustomed to do. The process being carried out in the dark and being accompanied by a partial destruction of cells and liberation of carbonic acid and the production of energy, it is highly probable that the newly formed cells would show a tendency, more particularly those of future generations, to prefer reproduction by means of destruction of neighbouring cells.

There would thus be side by side two sets of cells, the cell producers and the cell consumers. The latter, however, would also be cell producers or rather cell modifiers, but only at the expense of other cells. Food cells would be absorbed until the increasing bulk of the consumers would result in a splitting up and a breaking away; a primitive birth. Here then is the first sign of sexual reproduction. The male pollen or spermatozoon is even now absorbed as if it were mere food by the female seed or ovum, which then separates from the parent and the product is a new individual. In its primitive form sexual reproduction may therefore be related to feeding. In both cases cells are consumed whereby a specialised energy is created which liberates energy or effects growth in one case and results in births in the other.

Let it now be assumed that after a very long period in the world's history a marked differentiation between cell producers and cell consumers had taken place, both groups having the double power of splitting up and separating, and of absorbing or simply adhering to each other. Then one might conceive organisms to have come into existence consisting both of groups of cell producers and of cell consumers. In one set of organisms the cell producers would be the predominating partner, while in the other cell consumers would occupy that position. In the former set the consumers would feed on their own cell producers, and with the assistance of the liberated energy might become so highly specialised that the function of reproduction would mainly devolve on them. Such organisms are called plants. Their roots and leaves convert the chemicals of the soil and of the air into cells. Of these some are consumed in the flowers and seeds and their stored-up energy is converted into highly specialised forms associated with the pollen and the seed. That set of organisms in which the cell consumers predominated would have to rely for cell food on other organisms, which would have to be searched for, and their cells would be consumed to supply both the matter for the necessarily highly specialised nerve energy required for locomotion, as well as for that energy which effects reproduction.

This consideration may raise a doubt as to what constitutes the real individual, the male and female or the spermatozoon and the ovum, the fungus and its pollen. Certainly the mushroom life of these plants when compared with the long and wonderfully complicated underground life of their pollen does not lead to the conclusion so readily accepted by man that he and not the spermatozoon represents the object and essence of life. And yet if economy as regards matter is one of the tendencies of energy, then a single spermatozoon whose dimensions are measured in hundredths of a millimeter instead of in meters, which contains or at least conveys all the outward form, the

inner constitution, the main characteristics and even trifling habits from father to son, must be considered infinitely superior to the bulky man.

This brief speculation about the lines along which cell energy developed towards the creation of plants and animals, and on the origin of feeding and reproducing functions, although it may not be correct, gives a slight insight into the nature of cell life and helps towards an understanding as to what is meant by saying that cell energy like chemical and physical energy is a manifestation of indestructible energy. But as cell energy is life, life is also a manifestation of energy.

In previous remarks about energy it has been shown, not only that one does not know what energy is but also that it cannot be located. It is associated with material objects but even in such a simple case as the combustion of hydrogen in oxygen it is not correct to say that the energy which appears as heat was located either in the oxygen or in the hydrogen. When dealing with electricity the amount of energy could, it is true, be measured, but only in meaningless units like Volts, Ohms, etc., and now that a further step has been taken—cell energy or life has been recognised as being energy—it seems impossible to locate it, to understand the factors of which it is composed, or to measure them. No wonder that life is a mystery, and no wonder, too, that those who wish to explain it should reveal their inability by declaring life to be something still more incomprehensible than it is but about which further enquiries ought not to be made.

Some light may one day be thrown on this difficult subject, for even electricity, though known to the ancients was an utter mystery for several hundreds of years up to the days of Volta and Galileo, and some discovery may suddenly help towards an understanding or at least definition, firstly of the several forms of chemical energy and then, perhaps, of life, but nothing would be gained in the present state of our knowledge by describing even in the

briefest form, the infinity of vegetable and animal structures and functions. It should not, however, be overlooked that each single cell is as much a force of nature as any form of chemical or physical energy, and that therefore in the organic world the numbers of manifestations of energy are infinitely numerous. Fortunately, large numbers of cells are almost as like each other as are the atoms of a single element, and even combinations of groups of cells as they are found in individual plants and animals are arranged after one pattern and one is, therefore, perfectly justified in looking on each organic individual as being as much a force of nature as gravity, heat, electricity, etc. These act along simple but clearly defined lines, individuals also act along lines which are equally clearly definable but which are not expressible on account of the high complication and specialisation of this class of forces of nature and the primitiveness of even our highest mathematics.

Groupings of cells may thus be considered as being high forms of specialised energy, at any rate the specialised energy which is called an individual is the sum total of all his cells. The life of an individual is the life of all his cells and of all their combinations; they act and react on each other and they nearly neutralise each other, for the enormous energy which is produced by them rarely shows itself. Each cell contributes a share of its energy to the building up of the general system of the body. In the days of plenty there are innumerable excesses of energy which sum themselves together and appear to the outer world as individual life, as character.

The principle of grouping, not of cells but of individuals, and letting them represent forces of nature will be still better understood by glancing at one of its highest forms of development as exemplified in the case of bees, ants, etc., and perhaps even in nations. Not only do the individuals consist of groups of diverse cells, but each nation is a group of individuals, everyone bent on finding

food, on reproduction, and all striving with each other. Slight residual traces of energy, hardly as much as a thought, may join themselves together and constitute the collective instincts, public opinion, or national policy. Thus although it is permissible to treat each cell as representing a force of nature, this can also be done with a combination of cells, with the individual and also with the tribe or the state. This could not have been done with the chemical forces, for each one is too distinct, and to speak of the physical forces, gravity, heat, electricity, as a whole is merely a convenience; there is no practical similarity between them, but there is almost perfect identity between one living cell and its neighbour, and therefore a congregation is practically a unit. In this search after the manifold manifestations of energy, one gradually comes to recognise it, not only as cell life, as individual life, but also as the life of the species, and the life of the species is evolution.

However, before dealing with that subject, let us enquire into the value of the information which can be obtained on this grand subject from geological records and other sources.

GEOLOGICAL RECORDS.

The idea that one species has been evolved out of another is doubtless an old one, but not until Darwin, at a comparatively recent date, indicated a probable process of evolution and pointed to fossilised remains of animals and plants as being one proof of the correctness of that view, the other being embryology, did it attain any scientific importance. The generation has not yet passed away which has heard its elders scoff at the idea that species should have been evolved and not created separately, while to-day, carried away by their enthusiasm for the new theory, some recent naturalists assert that all life has been evolved from a single germ, the meagreness of the geological proofs being no bar to their flights of imagination. Nevertheless all naturalists agree that the time limit fixed by physicists is too short to account for the overwhelming amount of energy expended or directed by evolution in the creation of species. Physicists starting from a few simple assumptions, assert that the time of formation of the stratified rocks cannot have exceeded certain comparatively short limits, whereas naturalists, unable to show how long it would take one species to evolve out of another, content themselves with fighting a rearguard action, and merely express the belief that physicists have under-estimated the period of habitability of the earth. The discovery of radium in the earth and its heat-producing power has again thrown the whole subject into the melting pot.

Lord Kelvin's estimate of the age of the earth, though he did not explicitly state this, is based on the assumption that the rate at which the earth is cooling is proportional

to its absolute temperature, but he made a very material modification in his premises due, no doubt, to the disinclination to admit that the earth's central temperature would have to be about half a million degrees F., which this theory would make it. He assumed that the earth became solid throughout, because rock being heavier than its lava, instead of floating, as ice floats on water and as solid iron floats on molten iron sank to the centre. By this mere assertion the estimated age of the stratified rocks was limited by the date at which all the externally cooled lava had sunk to the centre of the earth and made a solid earth having a uniform temperature, and the total period was fixed at from 20 to 40 million years. Unfortunately the theory on which this estimate is based is unable to explain the enormous foldings of the earth's surface. If the earth had been solid for twenty million years the constant wearing away of mountains would long ago have brought all land down to sea level or even below it, whereas it is known that the Himalayas and the Alps have been raised in very recent geological ages, and that the former are moving at a measurable rate, and one feels inclined to adopt any view which will show the earth's surface to be of the nature of a crust like the floe ice of the polar seas.

Professor Joly's estimate of nearly a hundred million years for the age of the sedimentary rocks of the earth was based on the idea that the saltness of the ocean is due to the slight trace of salt which is carried down by rivers. He therefore divided the ocean salt by the annual river salt and arrived at his estimate. He made no deductions for salt which is found in rain water, nor for the fact that only a very small surface of the earth, say 18 per cent., consists of exposed primary rocks, which alone should be considered as having provided the ocean salt. He also overlooked the fact that such drainage waters contain very little salt, and that sedimentary rocks contain more salt than the primary ones. Repeating the estimate by dealing only with those rivers which flow from granitic regions,

the age of the stratified rocks works out at a few thousand millions years which is just what Professor Joly wished to disprove.

Estimates of the age of the stratified rocks have frequently been based on their thicknesses and the rate of deposition, but more precise methods and fuller information than is yet available will have to be resorted to before it can be hoped to make even a rough guess. Yet unless something is known about the process which has given us the rocks in which fossils are embedded, unless some rough idea can be formed as to how much evolutionary history has been lost to us, how little has been preserved and what an enormous proportion of this residue is hidden away, until one can feel all this, one cannot expect to grasp the full meaning of evolution, the slowness and persistence of its efforts, the direction in which evolution tends, nor the general nature of this apparently the grandest manifestation of energy. The importance of the subject will, it is hoped, excuse what may otherwise appear to be a digression into an almost technical subject. In order, however, not to appear too speculative, numerical values, as in the chapter on matter and energy have here and there to be introduced and brief calculations made.

Temperature measurements made in numerous mines and bore-holes have revealed a fairly uniform temperature gradient in Europe, ranging from 40 to 60 feet per one degree Fah., or 30 meters per 1 degree C. Combining in each case the temperature gradient with the known conductivity of the rock, an estimate can be made that in Europe at least the earth's surface is losing as much heat per annum as would raise the temperature of a sheet of water 1 foot thick by about 1 to 5 degrees Fah., or 1 cm. thick by about 20 to 90 degrees C. Faith in this rather wide estimate is, however, at once shaken on finding that the rate of loss of heat in one and the same bore-hole differs at various depths. For instance, at Kentish Town the conductivities of the upper London clay and of the

underlying upper green sand are nearly identical, yet the temperature gradient per 1 degree Fah. is 44 feet in the one and 91 feet in the other, implying that the London clay is giving off twice as much heat as it is receiving from below. Is this perhaps due to radium in the boundary of the two strata? Then, also, there is the serious difficulty with regard to ocean temperature. Sea water is slightly compressible, and at great depths it is therefore slightly denser than above and would have no tendency to rise unless heated from below, nor would this tendency make itself felt unless the temperature increased 1 degree Fah. per 25 miles depth, which would be imperceptible. If then the oceans are receiving heat from their beds their temperatures should be uniform or slightly warmer with the depth, but actual measurements show that there is a decrease of temperature, just as if heat were passing from oceans down into the earth. Is it possible that under the oceans the earth is losing no heat? If that were so then Lord Kelvin's estimate must be manifolded.

The doubts which these few figures throw on the premises from which physicists start do not affect the general experience that under Continents at least the temperature steadily increases towards the earth's centre, and that at a depth of 10 miles there should be a temperature of about 1,000 Fah. (red heat), that at a depth of 20 miles all known rocks should be melted, and that at 30 miles even iron would be fluid. Added to this, it is known that under enormous pressures even solids are semi-fluids, so that it is not unreasonable to assume that the earth's crust is floating on a molten liquid, or on a solid which is of the nature of a fluid. Tidal and astronomical speculations demand a body which must be more rigid than the hardest steel, but as this condition does not seem to exist, it is reasonable to doubt the correctness of the theoretical speculations. In fact, as regards the tides it has now been found necessary to take into account natural oscillations of the oceans which were formerly overlooked. Earthquake

wave velocities are now helping to determine the internal elasticity, and already they reveal that the interior consists of concentric shells of different materials.

Attempts to determine the thickness of the crust will, it is hoped, soon succeed, for the difficulties of the problem do not seem to be insurmountable, but as yet the thicknesses can only be guessed at. Thus even if observations of the temperature gradient should not be conclusive, an estimated thickness of over ten miles would be arrived at by applying observations on sheets of ice to the earth's crust. Under the conditions of air and water temperatures as they exist, for instance at the North Pole, a definite thickness of ice of about 8 feet will be attained no matter how irregular the upper surface; even supposing that the irregularities have been caused by a crushing and shelving similar to that which takes place with the earth's mountain ranges. Even with very thick ice it will be impossible during any length of time for the atmospheric cold to maintain more than eight feet of thickness of ice in a frozen condition, for the under portions of shelved ice will melt away by contact with the sea-water, just as snow piled on a sheet of ice causes it to melt away from below. Now the ratio of the thickness of the polar ice to the irregularities of the surface heights is certainly not less than one to one and probably not more than four to one. In other words, pack ice in which there are surface irregularities of over eight feet is not likely to be thinner than eight feet nor much thicker than thirty feet; if thinner it would fall to pieces, if thicker it would be too strong to be crushed into irregular shapes.

Now the maximum heights of mountains and the depths of oceans are about five miles, making ten miles difference of level, from which it may be argued that the thickness of the earth's crust, always supposing that it is floating on lava or molten iron, is not likely to be less than ten miles nor more than forty miles. It is also probable that in former ages when the earth may have been hotter than

now, its crust was thinner and its mountains less high than now, possibly not reaching above the ocean surface, under which conditions stratification will at first have progressed very slowly, for the ratio of land to sea area will then have been less than now, but it is difficult to say whether after mountain ranges and Continents had been formed, these have occasionally been all reduced below sea level. The only prospect of doing this is through the study of the fossils of land plants, for until mammals were evolved in comparatively recent Eocene ages, all other animals were so constituted that they could live under water and would survive if all lands were flooded.

The end of the world, contrary to general belief in fire and brimstone is therefore more likely to come when the earth has grown solid, for then all Continents will have been worn down and no new foldings of the earth's crust can occur, then all the world will be submerged and of mammals only whales, walruses and seals will survive and such furred animals as can live on ice.

Confirmation about the fluid condition of the earth's core can be gathered from recent geodetic surveys which show that mountains are less dense than Continents, and Continents less dense than sea bottoms. In fact recent observations indicate that sea bottoms are very heavy. The average density of the earth is very nearly 5·527 which means that the earth is composed of materials about twice as heavy as ordinary rock. Cold iron is fully two and a half times as heavy as rock. The density of molten iron is 6·5, and under the higher temperatures to be expected in the interior it may be 6·0. Now the earth's mean diameter is roughly 8,000 miles, or exactly 41,805,000 feet, or 501,660,000 inches. The average height of dry land spread over the whole earth is 675 feet, and if thrown into the ocean the sea level diameter of the earth would be increased to 41,806,350 feet. The average diameter of the earth's dry crust would be 41,790,000 feet. If the density of the earth's shell below the oceans is assumed

to be two and a half times the density of the ocean, water being taken as one, a very simple calculation shows that the inner core of a density of 6 would have to be two million feet smaller in diameter than the outer one. Even this thickness of one million feet or say 200 miles of probably molten rock, represents a coating of only one fortieth of the earth's diameter, but it is possibly from five to twenty times thicker than its hard outer crust. It is, of course, highly probable that the transition from light rock and light lava to heavy lavas rich in heavy, and, to us, precious minerals, down to the possible iron core is a gradual one. This arrangement would give great stability to the floating crust. If this were not the arrangement, if the earth's core were of uniform composition, one might safely expect that the cooling of the outer regions would result in a boiling up of the interior, a process which on the sun is perhaps the cause of sun-spots, and on the earth would cause convulsions of its crust, in comparison with which volcanic eruptions would be child's play. Possibly such upheavals have taken place in the heavy central core, carrying up vapours of intensely hot but heavy metals; these may have condensed under mountain tops and are, like platinum in the Urals, greedily sought after by mankind.

Recent comparisons of earthquake pressure waves seem to show that the earth has a centre core which is either much denser than the outer layers, or more elastic than these and possibly of a semi-gaseous nature.

In speculating on the condition of the earth's interior, physicists and mathematicians have paid comparatively little attention to the theoretical discovery, confirmed experimentally by Lord Kelvin and others, that substances which are lighter in the solid than in the fluid state, as for instance, water (ice) and iron, melt at lower and lower temperatures if subjected to higher and higher pressures, whereas substances which are heavier when solid than when fluid, are more difficult to melt with increasing

pressure. The melting temperature of iron sinks 10° F. for every 1,000 feet of rock pressure, which change, if true, for all pressures would mean that at a depth of one million feet, iron might be expected to be fluid at any temperature, or at any rate, at some comparatively low ones. On the other hand the melting temperatures of some rocks seem to increase with increasing pressure which would mean that the earth's hard crust may be thicker than say the 10 miles which have been estimated merely from the observed temperature gradients.

These few illustrations, which can hardly be called arguments, tend towards the view that the earth has a molten core of some heavy material, which is surrounded by a lighter fluid (lava) on which the still lighter earth's crust floats, while the oceans fill the depressions in that crust. Also that the irregularities of the earth's crust are due to differences in density, the sea bottoms being of heavier material than the mountain chains, or at any rate, that they indicate such differences.

On these assumptions one can now make a rough calculation of the thickness of ocean bottoms. Assuming, as before, that mountain rock has a density of $2\frac{1}{2}$, water being one, and assuming also that sea bottom rock has a density of $2\frac{3}{4}$, then as the difference of level between Tibet and the seabottom of the Northern Pacific is about five miles, it follows that the thickness of the solid bottom below the sea would have to be about 38 miles, because the pressure of 38 miles of rock of the density $2\frac{3}{4}$ and 3 miles of ocean water amounts to $38 \times 2\frac{3}{4} + 3 \times 1 = 107\frac{1}{2}$, which is exactly equal to the pressure of 43 miles of rock of the density of $2\frac{1}{2}$, the product being also $107\frac{1}{2}$.

The nature of changes of form will be understood from the following brief sketch.

It is well known that the underground isothermal surfaces follow approximately the contour of the outer surface of the land. In addition it has been found, and

it seems reasonable that this should be so, that the temperature gradient is steeper under recently raised mountainous land than under plains. It is therefore reasonable to assume that if the sea bottom with its heavy bottom constituents, which are good conductors of heat, is 36 miles thick, that a raised country like Tibet may probably be not more than 10 miles thick, or at most 20 miles, which means a not unreasonable temperature gradient of 1° F. in about 60 feet. Similar estimates could be made with regard to the Southern Pacific and the Andes.

What happens, firstly, if the earth is shrinking due to cooling, and secondly, if the dry land is being worn away and deposited over the ocean bottoms? Lord Kelvin assumes that the rate at which the earth is cooling is diminishing. This leads mathematically to the conclusion that the core is cooling faster than the shell, like an apple whose juicy inside shrinks and whose leathery shell shrivels, and it is thus hoped to account for the crumplings of the earth's surface, known as mountain ranges. It has, however, been shown that this cause is insufficient to account even for recent foldings such as the Alps and the Himalayas. Still less will this cooling account for miles of overthrust in the Alps and in Scotland. No physicists seem to have considered the case of the earth cooling at a uniform rate throughout when crumplings would of course not occur, and little attention seems to have been paid to the other possibility that the earth may have been cooling at an accelerated rate, due perhaps to better radiating power as the atmosphere got cooler and less saturated with water vapours. Accelerated cooling means that the crust shrinks faster than the core and that it will frequently split like a drying clay ball. Some explanation of this sort is, however, required to account for the numerous dykes which, as is well known, are merely earth cracks filled with solidified lava. None of the existing theories accounts for the phenomenon that even at present the earth's crust may simultaneously

crack in Iceland, while the process of crumpling and building up of mountain ranges is going on in other parts of the world.

Evidently both local expansions and contractions are and may have been active together, and these can most readily be explained by denudation effects. Consider the case of the South American Continent with its high mountain range in the west and its sloping tableland with enormous rivers in the East. Imagine that snow, ice and rain are eroding and dissolving away the mountain tops and depositing the sediment in the Atlantic, then two things will happen: weight being removed from the outer surface of the Andes, these being buoyed up from below by equally light but fluid matter should rise, and at the same time the load added to the Atlantic ocean bed should weigh it down. This abrasion and sedimentation will proceed without any material change in the effective thicknesses, for the surface temperature of the exposed mountain tops no matter how fast they wear away will remain what the atmosphere makes it, and as the temperature gradient is also an unchangeable quantity, the depth at which a change from solid rock to fluid lava occurs, would also remain unchanged. For instance, if at present there should be a depth of 50,000 feet of solid rock under the Andes, and if about 50 feet of the surface were to be carried away and a contour reached where the temperature is now 1° F. hotter than on the surface, then the newly exposed surface would soon acquire the present atmospheric condition and would lose its 1° F. excess temperature. But as the process would naturally be a very slow one, the whole crust would cool down by 1° F. and the point at which the change from solid rock to fluid lava occurs would not be at 49,950 feet, as would be the case if the abrasion had been sudden, but would still be 50,000 feet as at present. This means that for every 50 feet of rock removed from the outer surface, 50 feet of lava would be added by solidification to the under surface.

If, as is very probable, the lower strata which melt away under the Atlantic are heavier than the deposit added from the Andes, then the total weight of this part of the earth's crust, in spite of the added deposits will be lighter than it was, and the newly formed upper surface will rise instead of retaining a constant position. This rising is the almost universal experience of the ocean beds near all large rivers. Thus Ravenna, once a seaport town, is now four miles inland and well above the sea level. The same is true of Eridu and of Ur, the home of Abraham, ancient coast towns which are now more than a hundred miles inland. In fact, the Euphrates and Tigris valley is the grandest recorded case of rising of land above sea level, and probably the home of the legend of the deluge or rather of the emergence of land out of the sea. There in about four thousand years, roughly speaking, 10,000 square miles of sea bottom have risen out of the ocean and the process is still proceeding. What an ideal land for a peacefully increasing population! The Persian Gulf is still being silted up with river sediment, and where it touches sea level a continuous rise is noticeable. The same action is also going on at the mouths of the great rivers of Africa, India, China, Siberia, North and South America. New and comparatively light strata are there depressing the old strata of which the heavy bottom melts off, the total effect being a raising of the shore. At the same time the tops of the mountain chains are being worn away, and yet they are either maintaining their heights or rising perhaps faster than they wear away. This would have to be the case if the lava which flows upwards and solidifies is lighter than the removed rock. Finally after millions of years the last stratified covering will be worn away, and then the uppermost part of the cooled lava will appear at the surface as intrusive rock. The most convincing illustration of this process is to be found in Ireland in a worn away portion of the Mourne mountain where the lower Silurian strata, after being tilted on end and having

cracked, were melted away from below and now rest edgeways on a mass of granite.

The consequences of these changes are far reaching. Some newly formed igneous rock, say under the crests of the Andes, slowly rises, due to the wearing away of the overlying rock. These mountains are therefore cooling and shrinking. They have therefore either to tear across and cause outflows of lava, or if these rocks are strong enough to hold together, tears and cracks will occur at their extremities, as recently happened in San Francisco. One may, therefore, suspect that regions like the British Isles, in which innumerable dykes or cracks indicate long continued contractions, were once situated near the extremities of long mountain ranges which were being rapidly abraded. Possibly the earth cracks which still occur in Iceland may be due to the abrading action of the Greenland glaciers, an action which is believed to have commenced in historic times.

The effect of adding the material from abraded mountains to the sea bottom is to raise its temperature and to cause it to expand. This results in thrusts which, searching out the weaker parts of the earth's crust, the relatively thin mountain ranges, causes them to arch still higher. A sort of suction is thereby created under mountains, and the lighter portions of the material which melt off the underside of the sinking ocean bottom is drawn towards them and after a time solidifies there. Two actions, therefore, take place, cracks due to contraction occur at the ends of the mountain ranges, while mountain ranges between seas which are being silted up are compressed and thrust still higher upwards. Under special conditions the upheavals may easily be a hundred times greater than the thickness of the abraded material.

The present general distribution of mountain ranges which are being abraded and of coast lines which are being added to are as follows:—A long range of mountains stretches from Cape Horn to Alaska, interrupted by

the lower Panama and Mexican region. Almost parallel to this steadily contracting line is the steadily expanding and rising coast line of Brazilian mighty river deltas, the Mississippi and the St. Lawrence mouths. Almost at right angles to the American mountain chains but beyond the North Pole are the East Indian (Sumatra), Burmah, Himalaya and Afghanistan ranges, the Highlands of Mongolia, the Caucasus, the Alps and the Pyrennees. This line of contraction is surrounded by a triangle of expanding coast lines. In the south there is the Mediterranean, including the Nile delta, the Black Sea with the Danube, Volga, etc., the rising Persian Gulf, the mouths of the Indus, Ganges, etc. In the North is a long coast line traversed by the Siberian Rivers, the Baltic and the North European Rivers. In the East are to be found the deltas of the Chinese Empire and the Amoor. Thus, at present, the conditions seem to be that the two hemispheres are reacting on each other. It is not altogether improbable that the upheaval of the Asiatic and European mountain chains is due to the filling up of the Atlantic and of the Arctic Ocean by Canadian and Siberian rivers, and the rising of the Andes may be due to the filling up of the Indian and Pacific Oceans.

This action may in comparatively recent geological periods have been accentuated or perhaps initiated by changes near the Central American coast, whereby the Gulf Stream, originally flowing in other directions, may have been diverted towards Northern Europe and Siberia and warmed these parts. Thus Greenland and Northern Europe are quite 10° F. warmer than other regions of the same latitude and 15° F. warmer than those of the Antarctic regions. At any rate, geologically speaking, the recent glacial period has now disappeared. If the increased temperature has affected the Canadian and North Pole regions for an average depth of 15 miles, then the expansion would provide an excess of material measuring a few thousand miles in length and one square mile in section.

Assuming that the Himalayas measure 1,000 miles across, and that they have been recently raised or puckered by arching processes, then the above mentioned excess of material is more than ample to have produced the entire mountain range. Added to this there is the heating and expanding effect due to the crumpling of the mountain chain, and the already mentioned buoyant effect of the light lava, which always tends to flow to the highest levels.

It is not impossible that here are the means of estimating the time which has elapsed since the Eocene period when the Himalayas first commenced to rise. The abrasion and general wearing away of a length of 7,000 miles of European and Asiatic mountains by glacial action and by rain proceeds at the rate of about 1 mile in twenty million years, or about 3 inches in a thousand years. It will, therefore, take 200,000 years to wear away 50 feet, which corresponds to a fall of 1° Fah. throughout the underlying rock. The contraction of 7,000 miles in 200,000 years will therefore have amounted to 360 feet, and seeing that dykes, which are simply cracks which have been filled up with lava, are about 10 feet wide, one may expect such rents to occur at the extremities of this mountain range about once every 5,500 years, either across this range or at its extremities. If the fluid lava immediately under any of these cracks be lighter than the solid rock it will overflow, as it occasionally does in Iceland; if it be heavier than the rock, the resultant earth movement will generally be an earthquake, and if an inrush of water takes place into the crack the result will most likely be an eruption, similar to that of Krakatoa, or more recently Pelhayo in the West Indies.

It also appears that the sum of the maximum thickness of stratified rocks is over 400,000 feet, the average thickness being assumed to be 40,000 feet, and this addition to the sea bottoms must have been accompanied by a slow rise of temperature of the crust of say 800° Fah. with a

corresponding expansion of say one-tenth per cent. It is evident, therefore, that the total amount of crumplings and stretchings extending to a depth of say 15 miles of the Earth's crust can be represented respectively by a block of that depth and a hole of that depth covering one-fifth per cent. of the Earth's surface, which would be 200,000 miles square and fifteen miles deep. This amount of crushing and of cracking is more than ample to explain the formation of all the mountains which have ever existed and of all cracks and dykes.

Thus it appears possible for crumplings and crackings to occur simultaneously at different parts of the Earth's surface quite independently of the general rate of cooling, and calculations, based on the assumptions from which Lord Kelvin started, which will not explain cracks and will only partially explain crumplings, cannot be relied on for estimates of the ages of the different strata of the Earth's crust. Nor does it seem right that such a problem should be limited and circumscribed by at first fixing, by very doubtful data and theories, the total period within which all stratified rocks have been formed and then attempting to fill in the historical sketch. A time scale is certainly wanted by palæontologists, but except in early days, before Lord Kelvin made his estimate, little seems to have been done to study in detail the rates at which the various materials are deposited, and the tilting and upheaving and depressing of land seem never to have been thought of as influencing the calculations, yet they are an all important factor.

Changes of level have been recorded in only a very few regions. Scandinavia seems to be rising at a rate of about a foot per century, Japan is being tilted, the East and South coast rising, the North and West coast sinking at about ten times the above rate. The Canadian lake region is also being tilted at the rate of about one foot per 1,000 miles in ten years, and in 5,000 years the Niagara river should discharge into the Mississippi.

Holland is slowly sinking. These are the only measured changes, whereas nothing except geological evidence has been observed along the remaining 30,000 miles of coast line of the world. It is, therefore, perhaps reasonably fair to assume that the combined average rates of subsidence and of upheaval are say ten times slower than those mentioned above, or say, one foot per thousand years and that the average rate of tilting is also ten times slower, say one foot per 1,000 miles per century. It should, therefore, take 800 million years to tilt any strata through a complete right angle, as for instance, the Cambrian strata of Wales, and the Silurian strata of Ireland. Occasionally, as during earthquakes, tilting may progress more rapidly, but these sudden efforts are balanced by long periods of rest.

General subsidences and upheavals also lend themselves for time estimates. Thus glancing haphazard at a detailed statement of the strata of a small north country coalfield one finds 31 coal seams, 85 seams of shale and clay, 21 of pebbles, pudding stone (gravel), 69 of coarse and fine sandstones and grits, 14 layers of basalt and other volcanic products, and 19 of limestone. The coal seams are certainly due to land plants, and must have been formed above sea level, probably in extensive plains like our fens, placed under tropical conditions. Much of the volcanic material has also been deposited above water and the gravels will have been formed near river mouths either above or below sea level. Thus the ground will have been raised sixty-six times above or near to sea level. The grits and sandstones may be subaqueous deposits or perhaps blown sand like our dunes, and may all have been formed near sea level. The limestones have almost certainly been laid down in deep water, say below 500 feet or more, and they, as well as the clay shales, must have been far away from the shore, say 50 miles or more, when they were being laid down. The latter may have had 100 feet of water over them during their formation.

Generally speaking therefore, while these 31 seams of coal were being formed there were 19 subsidences of 500 feet or a total of 9,500 feet and 85 of 100 feet or a total of 8,500 feet. The upheavals amount of course to just as much making a grand total of 36,000 feet, which at the rate of 1 foot per thousand years would represent a time interval of 36 million years for the laying down of 31 coal seams. Of course, until the reasons for subsidences and upheavals are known, or until more reliable rates can be fixed, much uncertainty will be felt as to whether these periods are a dozen or more times too long or too short. Nevertheless as there are some regions in which over one hundred coal seams are found, one above the other, one should at any rate be prepared to admit that the up and down movements alone, not counting the sedimentation, may represent longer periods of time than Lord Kelvin allowed for the whole of say 400,000 feet of average thickness of stratified rocks.

With increasing information as to the ocean depths at which certain animals such as sponges, corals, molluscs, etc., lived, it may, perhaps, one day be possible to compare the rates of up and down movements with the rates of deposition, but these, too, are not only uncertain, but seem very much slower than physicists' assertions about the age of the Earth.

The following steps may perhaps permit of a tangible result being attained. According to Sir John Murray, the volume of river water annually discharged into the oceans is 6,500 cubic miles, which is estimated to contain as much calcium as would produce 2,300 million tons or about 1,000 million cubic meters of carbonate of lime, such as limestone, chalk, etc. The oceans could hold much more of this salt in solution than they do, but myriads of animalcula extract it from the water and form their shells with it, and after death these sink to the bottom of the oceans covering about 160 million kilometers with what is now globigerina ooze. On

the basis of Sir John Murray's estimate the rate of deposition is about 1 meter in 160,000 years, or say 1 foot in 50,000 years. Geologists, unfortunately, cannot give the average thicknesses of the strata but only the maximum thicknesses of those which have yet been discovered, and as it is likely that, in some regions where warm and cold ocean streams meet, the rate of deposition is much more rapid than in other parts, it is perhaps fair to assume that the maximum rate is ten times as fast as the above or say 1 foot in 5,000 years.

Seeing that materials which have been deposited in the past, gradually rise to the surface and are washed away again to form new strata, it is evident that the ratios of the maximum thicknesses of various materials are also the time ratios in which the maximum thicknesses have been deposited. Confining oneself to the British strata down to the upper Silurian the following rates are obtained.

Chalk, limestone, marbles, as above, 1 foot per 5,000 years.

Shales, slates, clay, by comparison, 1 foot per 5,000 years.

Sandstones, grits, flagstones, ditto, 1 foot per 2,000 years.

The last of these rates is a rather arbitrary one, the data being uncertain and unimportant because these coarse deposits are neither very thick nor very extensive. In the present state of knowledge it is difficult and unnecessary to make a more detailed estimate, but if desired, corrections might be introduced from the following rough statistics. The sea bottom deposits cover the following areas:—

Sands and clays about 80 million square kilometers or 34 million square miles, lime deposits 160 million square kilometers or 68 square miles, clay ooze 130 million square kilometers or 55 million square miles. On dry land there are 28 per cent. regions unexplored or hidden by ice, 5½ per cent. desert sand, and 18 per cent. plutonic or semiplutonic rocks, making a total of 51½ per cent. The stratified rocks cover the following areas: Quaternary

14 per cent., Tertiary 6½ per cent., Secondary 15 per cent., Primary 13 per cent.

Applying the rate of depositions given above, to 83,000 feet of maximum thickness of British strata, the total period of deposition sums up to 273 million years which is at an average rate of 3,300 years per foot. The upheavals and subsidences may on an average add two to seven thousand years, making say five to ten thousand years per foot of maximum thicknesses. This time unit is of the magnitude of the period that man seems to have lived in some sort of civilised condition. Manetho's list of the dynasties of Egypt, which is being confirmed by excavations, gives the date B.C. 5,800 for the first historical king of Egypt, while the Sphinx is probably still older by one or two thousand years, and may have been hewn nine or ten thousand years ago. This time unit of 10,000 years agreeing roughly with the estimated time required for the deposition of one foot of sediment, may, for convenience, be called an "Era," and when geological knowledge has improved, its exact value, whether ten or one thousand years, may be more accurately fixed.

In the following table the maximum thicknesses in feet of strata in various parts of the world are stated in brackets, and of these the thickest are repeated as Eras in the margin, and then added together.

THICKNESSES AND AGES OF GEOLOGICAL STRATA.

(The bracketed numbers are maximum thicknesses measured in feet.)

	Age in Eras.
MIOCENE: England (1425)	
OLIGOCENE: France (4200), Alps (7500). Recent strata are probably nearly all submerged below the sea level, it will therefore be assumed that they represent	20,000

	Age in Eras.
Upper Eocene: England (660), Biarritz (3,000), Nari, India (6,000), Rocky Mountains, America (800)	6,000
Middle Eocene: England (300), Kirthar, India (9,000), Rocky Mountains, America (2,000)	9,000
Lower Eocene: England (500), Alps (5,000), Ranikot, India (2,000), Rocky Mountains, America (3,600)	5,000
Indications of a Glacial Period.	
The sudden appearance of mammals in the Lower Eocene suggests a probable long time interval, say	20,000
Upper Cretaceous: England (2,500), France (800)	
Middle Cretaceous: France (2,950)	
Lower Cretaceous: England (2,350), France (140)	
Total Cretaceous: Mexico (5,000), America: Livingstone (7,000), Montana (2,800), Colorado (2,000), Elder Creek (30,000), Canadian Pacific slopes (13,000)	30,000
Upper Jurassic: England (4,200), France (10,400), Germany (1,000), Russia (extensive)	10,400
Lower Jurassic: England (1,200), France (9,100)	9,100
Triassic (Keuper): England (5,000), Central Europe (1,230)	5,000
Muschelkalk: Central Europe (3,730), Alps (13,000)	13,000
Upper Permian or Dias: England (1,060), Germany (4,000), America (1,000), Godwana in India (?)	4,000
Middle Permian: Damuda, India (10,000)	10,000

	Age in Eras.
ROTHLIEGENDES: England (2,400), Germany (6,000), France (3,300), Russia (enormous, say 10,000), Asia (extensive), North America (1,000)	10,000
Indications of a Glacial Period.	
COAL MEASURES: Wales 75 seams (12,000) followed uncomformably by Permian strata, Germany 142 seams (19,000), Russia 24,000 square miles 114 seam (extensive), Dwyka, Africa (4,000), Arkansas, America 20,000 square miles (24,300)	24,300
Climate believed to have been tropical.	
MILLSTONE GRIT: England (5,500)	5,500
LOWER CARBONIFEROUS: Northumberland (9,200), America (1,700)	9,200
CULM: Germany (2,500)	2,500
DEVONIAN: OLD RED SANDSTONE; England (17,000), Norway (1,200), North America (9,500)	
DEVONIAN PROPER: England (14,000), America (extensive), New Zealand (10,000)	
DEVONIAN AND OLD RED SANDSTONE MIXED: in Russia (extensive)	14,000
SILURIAN (UPPER): England (small area) (24,500), Baltic (600), Bohemia (5,700), America (enormous), Bolivia, Peru, Argentina, China, India (extensive)	24,500
ORDOVICIAN (LOWER SILURIAN): England (small area) (13,500), Bohemia (300)	13,500
UNCONFORMABILITY, an interval of say	20,000
CAMBRIAN: England (small area) (18,000), Ardennes (10,000), Spain (10,000), China (very thick), India (3,000), America: Rocky Mountains (7,000), Nevada (7,700), British Columbia (10,000).	

	Age in Eras.
UPPER CAMBRIAN: Newfoundland (200), New York (5,000)	18,000
Indications of a Glacial Period.	
UNCONFORMABILITY, an interval of say	20,000
PRE-CAMBRIAN, TORRIDON: Scotland (10,000), Baltic (extensive), Eastern Canada (12,370), Moutaur (12,000), Colorado (12,000), KEWEENAWAN (50,000)	50,000
PRE-CAMBRIAN, HURONIAN: America (17,000)	17,000
Indications of a Glacial Period.	
UNCONFORMABILITY, an interval of say	20,000
PRE-CAMBRIAN, CONTCHICHING: America (20,000)	20,000
PRE-CAMBRIAN, LAURENTIAN. Say more than	20,000

SUMMARY OF AGES OF STRATA.

	Strata Eras.	Total age Eras.
Recent, say	20,000	20,000
Eocene	20,000	40,000
Probable interval, say	20,000	60,000
Cretaceous	30,000	90,000
Jurassic	19,500	109,500
Triassic	18,000	127,500
Permian or Dias	24,000	151,500
Upper Carboniferous	29,800	180,300
Lower Carboniferous	11,700	192,000
Devonian or Old Red Sandstone	14,000	206,000
Silurian (upper)	24,500	230,500
Ordovician (or lower Silurian)	13,500	244,000
Unconformability, say	20,000	264,000
Cambrian	18,000	282,000

	Strata Eras.	Total age Eras.
Unconformability, say	20,000	302,000
Keweenawan	50,000	352,000
Huronian	18,000	370,000
Unconformability, say	20,000	390,000
Contchiching	20,000	410,000
Laurentian, say more than	20,000	430,000

NOTE.—The Pre-Cambrian strata, including some not mentioned in the above tables have proved difficult subjects with which to deal, but the above thicknesses and their order of succession are probably not far wrong.

Taking an Era as representing 10,000 years, the above total works out at over four thousand million years. If, however, the times required for upheavals and subsidences be entirely omitted, and if it be assumed that the rate of deposition of maximum thicknesses is not ten times but thirty-three times faster than the mean rate, then one Era would represent only 1,000 years and the age of the stratified rocks would work out at about four hundred million years.

It will be noticed that if this faster rate be adopted each geological sub-division or strata in the table represents about ten, twenty, or thirty million years or say three, six, or nine hundred thousand human generations. But seeing that during the 300 generations (10,000 years) since the supposed dawn of civilisation, man does not appear to have changed, though he has invented houses, implements, clothes, cooking, and many other things which must affect life, one may fairly ask whether Evolution could, in say, 2,000 such periods, which is here assumed to be the time interval between the Cretaceous and Eocene have produced all the mammals; the whale, the ungulates, the carnivora, etc., which quite suddenly appear in the early Eocene? Is it not more likely that the slower scale of 10,000 years per Era is nearer the truth?

This estimate, or rather guess, as to the age of stratified rocks may by many be considered superfluous and should have been replaced by a brief statement by some well known authority. Unfortunately, due perhaps to Lord Kelvin's repeated assertions, geologists have feared to tread this problematic path, and there is at present no reasonably definite statement on this question by any man of weight. This is an advantage to the readers of these pages, who, being initiated into one method of making estimates, can carry these out according to their own inclinations. But whatever the numerical result arrived at may be, they will very soon have to admit that the great manifestation of energy, called Evolution, has been at work over a period which puts into shade all but such primitive manifestations of energy as are dealt with by Astronomy, so that on account of its persistence alone Evolution deserves to be singled out for special admiration.

It is however not only the length of time that Evolution has been at work, but also its infinity of resources which claims attention. Blindly striving, like all manifestations of energy, aiming at economy of material and specialisation of itself, this form of energy has never lost heart, neither in face of its own numerous failures, nor when thwarted by more primitive forces of nature. Thus in the lowest strata to be found in Canada many layers are found of graphite, which, it is believed, is overheated organic matter, its total thickness, so it is said, exceeding that of our own coal fields. Is it possible that the world was once full of life, possibly vegetation of some sort, during the days when the coal measures were being laid down, and that some gradual, but fearful catastrophe destroyed all that life, and that Evolution had to commence afresh? Has there been a past end of the living world, and if so, what was the cause of its ending? Was it fire or water?

It has already been suggested that in the same way as

the thickness of the Polar pack ice determines the heights of its irregularities, so also does the thickness of the Earth's crust determine the heights of the mountains above the sea bottom, which at present are about 10 miles. During the early history of the stratified rocks, when the Earth was warmer than now, the crust will probably have been thinner than at present, and the differences of level between mountain tops and sea bottoms may have been less than three miles, under which conditions there would have been no dry land, for the average depth of the ocean is 8,150 feet or say one and a half miles. This may have been the case when the Earth's crust was about one-third as thick as it is now, and this case must recur when the Earth has grown quite solid and the mountains have been worn away. Then, as may have happened in the past, all surface life, all land plants, all air breathing animals except the whale, the walrus, etc., would perish.

It is not necessary to suppose that the crust has been steadily growing thicker, it may have varied its thickness, and this may have resulted in there once being very high mountains, and at other times entire or partial submergence. The most probable causes for changes of thickness would be these very changes of level which they produce. It could be shown, but the subject is rather mathematical, that although the sun is the cause of the heat in the atmosphere, the amount of heat or rather the temperature near the Earth's surface is determined by the heights of mountain ranges, which, as the atmosphere tumbles over them, causes it to get thoroughly dried, mixed, and heated. It can be shown that, roughly speaking, for every 1,000 meters, or say 3,250 feet added to the highest mountain ranges, the average sea level temperature of the Earth would rise 10° C. or 18° F., and conversely a wearing away of mountain ranges to this extent would lower the surface temperature by this amount. If then, long before the Andes and Himalayas, which are quite modern

mountains of say 25,000 feet, were raised up, no other mountains of more than 10,000 feet high existed on the Earth, its surface temperature will have been about 30° C. or 54° F. lower than it is now, which means, that Klondyke conditions would have prevailed right down to New Orleans and also across the Mediterranean. On the other hand, if existing mountains were to be pushed up to heights of 40,000 feet, sub-tropical conditions would extend almost to the Poles. Nearer the Equator the atmosphere would then be not only terribly hot, but also heavily laden with moisture, and vegetation rather than animal life would flourish. This may have been the condition during the coal age and perhaps during the Laurentian age, whereas during the recent glacial period, during the Permian, at the beginning of the Cambrian age, and during a portion of the Huronian age for which periods indications of glacial action have been found, our mountains may have been very low.

If for millions of years the Earth's surface had once been very cold, due to small differences of levels, the crust of the Earth would grow uniformly thicker than it is now, even only to the extent of a 3,000 feet corresponding to a drop of 48° F. brought about by a lowering of mountain ranges to two-thirds of their present height, and any crushing movements which then occurred would pile up mountains more than fifty per cent. higher than the present ones. On the other hand, when high mountains had come into existence, when tropical heat and torrential rains had been the order of the day, the Earth's crust would grow thinner again, especially under the mountain ranges. The material which was worn away would not necessarily be made good by upheavals and shelvings of the crust, which would be rather weak, and a period in which the ranges of mountains would be low might follow. There have been attempts to explain glacial periods astronomically but they are not very convincing, though should they be established on a reliable

basis, a very good time scale for geological events will have been introduced.

Temperature variations are not the only possible changes which may have affected life on the Earth. Who has yet explained the presence of chlorine which, as salt, exists in our oceans? It cannot be found, except in mere traces, in the plutonic rocks, and if, as has here been suggested, these are merely re-melted stratified rocks, the presence of even considerable amounts of chlorine would not account for its origin. Vague suggestions are now and then made as to the possible origin both of the chlorine, the hydrogen and the nitrogen on the Earth, but they lack definitiveness unless it be assumed, as has here been done, that interstellar space contains gaseous elements and that these are absorbed by such cosmic flakes as pass through them and are conveyed to the suns and planets. Without such carriers no gases could attach themselves to these bodies.

Now there is a solitary record mentioned by Chladin (Die Feuerkugeln) in his list of ancient meteorites which says that the waters of a lake in Asiatic Turkey once suddenly turned so terribly bitter that all its fishes perished. Is it possible that this lake was struck by a poisonous meteorite, which, like the celebrated one in Sweden, may have consisted of cosmic dust, which had traversed some far off interstellar region in which chlorine or its compounds predominated, and had absorbed these, just as it would have absorbed hydrogen if it had traversed the great nebula in Orion?

Whether this incident be a true record or not, it is at any rate conceivable that cosmic dust, either as meteoric flakes or as cometary nucleii charged with chlorine or hydrochloric acid, may at one time have entered the solar system, that, on nearing the sun, this gas may have been driven off in the form of comets' tails, and that it then floated about and gradually attached itself to the Earth and other planets. The first effect of the addition, even

if only a slow one, would have been to kill almost all, if not all, life which was then existing either above ground or below water. After a lapse of time the soda and other salts in the rocks would neutralise the chlorine or acid and would form the common salts of the ocean. Life, however, would have had to be restarted, possibly under more favourable conditions. The production of lime skeletons of which most fossils consist would now be facilitated, for salt helps to dissolve the nearly insoluble lime salts and is a very important auxiliary in the body. Is it possible that such a catastrophe occurred after the Laurentian age, and that the diatomacea (minute plants), radiolaria, and the silica sponges all having silica frames which are not attacked by acids, are survivals of the first creation? These are certainly very hardy plants and animals and even if first evolved under fresh water conditions they may have adapted themselves to salt water when this came into existence. The further and further back one is able to trace them the more they seem never to have changed their form.

One such cometary or cosmic catastrophe may have been followed by another. It still remains a puzzle to geologists why the material of entire strata is generally so very uniform. Why, for instance, is the lower carboniferous strata the world over almost exclusively composed of limestone? Why are the cretaceous strata nearly always chalk? Is it possible that at odd times the Earth was bombarded either with carbonate of lime meteorites, carrying carbonic acid, a gas which has been recognised in distant stars and which is suspected in the tails of recent comets? A dose of carbonic acid gas may have been thrown into the solar system of which a part reached the Earth in the Pre-Cambrian age and again during the Carboniferous age, on each occasion it would attack the felspars, and would appropriate the lime, and leave the silica and alumina to shift for themselves. In fact, if all the carbonic acid of the limestones and all the hydrochloric

acid of the ocean salt were removed from the Earth's surface and the remaining constituents of the crust melted together, the product would be a kind of felspar. This would mean that the original coating of the Earth may have been felspar, which by external addition of acids has been split up into silica, carbonate of lime, sea salt, and alumina. These are, of course, mere speculations, but they open up possibilities which are inadmissible if one refuses to admit that extraneous matter can have joined the Earth.

Life would almost certainly have been possible if at one time the Earth's crust contained even only a little carbonic acid, for this would suffice to supply the carbon in organic cells, but with each large addition of carbonic acid, and before this was joined to the lime of the felspars, organic life, if it had already come into existence, would be able to make wondrous strides. This may account for the luxurious vegetation during the Coal ages, and possibly during part of the Pre-Cambrian ages. The result would be enormous deposition of carbon in the Earth's crust and a plentiful liberation of oxygen. If this view be correct, the underground coal should just about balance the oxygen in the atmosphere, and this would be the case if on an average about 30 inches of coal were spread over the face of the Earth. Seeing that some coal fields cover large areas of land, and that occasionally the thicknesses of the seams aggregate more than 100 feet of coal, and that parts of these seams have risen to the surface and have been abraded whereby the coal has been lost, for it does not oxidise and is hidden away in more recent strata, then the above estimate of an average of 30 inches is a perfectly reasonable one. Thirty inches of coal ground up and mixed with 15,000 feet of average strata which have been deposited since the coal ages amounts to only one-hundredth per cent., a quantity which is too small to be sought for by analysts.

It follows that on each occasion when either through

external or accidental causes vegetation was so luxuriant and widespread as to cause many feet of coal to be laid down, the percentage of oxygen in the atmosphere would be materially increased. This might mean death to many forms of life, just as a permanent increase of oxygen would either kill off or modify most of the air breathing animals of to-day, and certainly an examination of the following palæontological table shows that a large number of animals either disappeared or changed their forms during and after the coal ages. But it is of far greater importance that with every addition of oxygen the cell consumers and energy producers would be more favourably situated than before and animals of greater energy capacity would develop. Thus the reptiles, an air breathing family, as well as birds, were rapidly developed after the coal ages had increased the available oxygen.

A similar, but unknown change may have come over the world between the Cretaceous and Eocene ages. At any rate with the dawn of the latter period practically all the mammal species have come into existence, whereas none existed in the previous geological age and mammals, which are air breathers and typical destroyers of cells and creators of highly specialised forms of energy require both abundance of oxygen and of vegetable food.

These several views suggest themselves when glancing over the following palæontological table but several things have to be borne in mind while doing so; firstly, the vast periods of time which have rolled on since the dawn of life on Earth; secondly, the persistence of form of certain animals, which seem, at an early period, to have attained the perfection necessary for living under all conditions which have since occurred and may yet occur. Especially are the radiolaria believed to date back to the most ancient antiquity. Thirdly, the enormous number of different forms of life. Thus it appears that 400,000 different species of animals have been described by

naturalists, and more are being found every day. Insects which are represented by only a few orders, placed in only four columns in the table, are said still to exceed 200,000 different forms. What the number may have been when insects were in their glory, before the days of birds and other enemies, it is difficult to say, for as long as there were no birds, the insect plague on Earth must have been more fearful than it is in districts near Volcanoes where after big eruptions all birds are frightened away for years from over thousands of square miles. With insects, perfection of form seems to have been reached at a very early date, the cockroach and scorpion having been found in Silurian strata and no material change seems to have taken place since then. This may be due to the fact that insects in their several stages of development live either under water, in the ground, or above it, and changes in the amount of oxygen would probably not affect them seriously.

Fourthly, one should take note, how Evolution, this grandest of specialised manifestations of energy, has persistently been working towards improvement; not discouraged by the destruction of one or other of its *chefs d'œuvre,* as for instance, the ancient and numerous trilobites and the more modern reptilian monsters, nor by its inability still further to improve certain of its creations, like radiolaria and insects, it has over and over again started afresh from more lowly forms. Only half satisfied with his latest vase, the potter (Evolution) has taken a new handful of common clay and started afresh. The instinct of the insects, their power to live indifferently well in any one of the three elements, their power to burrow, to swim, to crawl and to fly, their hard external shells; all these might seem the height of perfection, but Evolution was not content, energy of which it was a manifestation, did not in these wonderful forms represent the attainment of its persistent striving to be associated with a minimum of matter, for although insects are small

and light they also have little energy and generally live very short lives. Evolution tried again, it started afresh on a far more lowly form, one in which not the whole body, as in arthropoda, but only the vitals were encased. It created true eyes for some of the molluscs, as for instance, for the squid, or perhaps Evolution was limited to work with two eyes and improved these, and through slow stages it developed the fish with its nervous system enclosed in bone, out of these the reptiles and ultimately, but again from a more primitive form, the mammals with their large sized brain.

The table has been arranged on the assumption that the forms of animals change more easily than their substance. Thus there are the plant-like radiolaria with their silica shells and sponges with their silica skeletons. Then come a crowd of animals in which either the bases or the shells are lime as in corals. Amongst these must be included the arthropoda, though the shells of the great insect sub-division are horny with a trace of phosphate of lime. In a third group which embraces the molluscs up to the mammals, the skeletons, or encasements of the vitals are lime and phosphate of lime. Recently the discovery has been made that certain minute animals have iron oxide casings, these are not included in the table. These changes seem to suggest that Evolution has experimented, blindly but effectively, with all available materials and with all conceivable forms, and a survey of this work must engender an awe inspiring feeling that one is contemplating a living force, a something like life, a something that is a manifestation of energy, which cannot be located, any more than chemical energy can be located, but of which it is felt that it is a grand reality.

The labour, incomplete though the results may be, which has been expended on this subject, gives a prominence to Evolution which, to those who care not about these things, seems undeserving. Is that possible? Can too much prominence be attached to this subject? Is not

this a manifestation of energy in which its striving is not only as grand as that of the more lowly forms, such as attraction, gravity, etc., but in which specialisation has been carried along such well defined lines that the secret of the strivings of energy seems to stand revealed? At any rate, as illustrating the essence of energy, Evolution will always deserve the attention which it is hoped this brief sketch of the vastness of its labours may have created. The paucity of geological records, which is disclosed in the following table, the difficulty of explaining embryological changes, and the shortness of time since Darwin insisted on the recognition of Evolution as a living force, militate against a full understanding of the subject, the following chapter will therefore deal with Evolution rather in a speculative than critical mood.

Geological Strata.	Doubtful.	Protozoa. Silica Cases.	Silica Frames.															Lime Cases or Frames.						
			Spongida—Sponges.															Protozoa	Echinodermata.					
																			Sea Urchins, etc.			Stone Lilies, etc		
Numbers of Species	None	2000 to 4000																2000						
Recent -	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eocene -	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prob. Interval	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cretaceous -	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Jurassic -	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triassic -	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Permian or Dias	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Upper Carbon.	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lower Carbon.	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Devonian -	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Upper Silurian	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ordovician -	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unconform.	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cambrian -	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unconform.	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Keweenawan	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Huronian -	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unconform.	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Contchiching	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Laurentian -	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	§ [Layers and flakes of graphite suggest Laurentian coal measures. Also "Eozoon," possibly a fossil.]		* Radiolaria. (Floating micro-organisms having perforated cases)		* Monactinellidæ. (Colonies of micro-organisms)		* Tetractinellidæ. (Colonies of micro-organisms)		* Lithistidæ. (Colonies of micro-organisms)		* Hexactinellidæ. (Colonies of micro-organisms)		* - † [Octactinellidæ]		† [Recteractinellidæ]		* Receptactinellidæ. (Colonies of micro-organisms)		* Pharetrones		†	* * Leucones. (Colonies of micro-organisms)	* Foraminifera. (Floating micro-organisms with perforated cases)	* Holothuroidea (Sea-cucumbers)		* Echinoidea (Sea-urchins)		* Asteroidea (incl. Starfish)		* Ophuiroidea (Brittle Stars)		* Crinoidea		* New forms		* Cystoidea (Sack-form lilies)		†	* Blastoidea (Bud-form lilies) †	

* and † indicate respectively the first and last geological appearance of the particular forms.
§ indicates the geological appearance and disappearance of a short-lived order.

Geological Strata.	Carbonate of Lime (Aragonite) Bases. Coelentera—Corals and Jelly Fish.					Phosphate of Lime Shells. Polyzoa.	Phosphate of Lime Shells. Brachiopoda.				Worms belonging to various families	Moulting Cases of Chitin for Body and Limbs. Compound Eyes. Arthropoda. Crustacea.				
Numbers of Species living -					None					None				None	None	
Recent - -	·	·	·	·	..	·	·	·	·	..	·	·	·	..	..	
Eocene - -	·	·	·	·	..	·	·	·	·	..	·	·	·	..	..	·
Probable Interval	·	·	·	·	..	·	·	·	·	..	·	·	·	..	..	·
Cretaceous -	·	·	* Corynida	·	.. ..	·	·	·	·	.. ..	·	·	·	.. ..	.. ..	·
Jurassic - -	·	·	..	·	..	·	·	·	·	†	·	·	·	..	..	·
Triassic - -	·	·	..	·	..	·	·	·	·	·	·	·	·	..	..	·
Permian or Dias	* New forms (incl. Red Corals)	* New forms (incl. Ordinary Corals)	..	·	..	* New forms (incl. Sea-mats)	·	·	·	·	·	·	·	..	..	·
Upper Carboniferous	·	·	.. ..	·	.. ..	·	·	·	·	·	·	·	·	.. ..	.. ..	·
Lower Carboniferons	·	·		·	·	·	·	·	·	·	·	·	·	†		·
Devonian and O.R.S.	·	·	..	·	·	·	·	·	·	·	·	·	·	·	†	·
Upper Silurian -	* Alcyonaria	·	..	* Hydrocoralline	† [Graptolites]	·	·	·	* Protremata	·	·	·	·	·	·	·
Ordovician -		* Zoantharia			*	* Bryoza	·	·		* Telotremata	·	·	·	·	* Eurypterida	* Xiphosura (incl. King-crabs)
Unconformability	..	..	..	..	..	..	·	·	..	..	·	·	·	·	..	..
Cambrian -	..	..	..	..	..	..	* (Paterina & Lingula) Atremata	.. * Neotremata	..	..	·	·	·	·	..	..
Unconformability	..	..	..	..	..	..	..	..	..	..	·	.. * Ostracoda	.. * Phillopoda	·	..	..
Keweenawan	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	·	.. ..	.. ..	.. * Trilobita about 2000 forms	.. ..	.. ..
Huronian -	..	..	..	..	..	..	..	..	..	..	·	..	..	..	..	..
Unconformability	..	..	..	..	..	..	..	..	..	..	·	..	..	..	..	..
Contchiching -	..	..	..	..	..	..	..	..	..	..	·	..	..	..	..	..
Laurentian -	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. * Markings like roots or wormtracks. In the upper strata these marks are unmistakably worm tracks	.. ..	.. ..	.. ..	.. ..	.. ..

* and † indicate respectively the first and last geological appearance of the particular forms.
§ indicates the geological appearance and disappearance of a short-lived order.

Geological Strata.	Moulting Cases for Bodies and Limbs of Chitin (continued). Compound Eyes (continued). Arthropoda (continued). Crustacea (continued).									Insecta.				Case for Bodies of Aragonite.			Some Internal Parts enclosed in Carbonate of Lime Cases. True Eyes. Molluscs.		
Numbers of Species living				None						250000					50000		None	None	None
Recent	* Anchoracephala (incl. Barnacles)	* Amphipoda (incl. Sand-Hoppers)	* Isopoda	§ [Cumacea]	* Stomatopoda	* Schizopoda (incl. Opossum-Shrimp)	* Macroura (incl. Lobster, Prawn, Shrimp)	* Brachyura (incl. Crabs)	* (Cockroach) Insecta	* (All living types)	* Myriopoda (incl. Centipedes)	* Arachnida (incl. Spiders, Mites, &c.)	* Scorpionida (incl. Scorpions)	* Gasteropoda (incl. Univalves, Snails, &c.)	* Lamellibranchiata (incl. Bivalves, Oysters, &c.)	* Comilaria	* Goniates or Ammonoidea †	† [Ammonites]	* Phillocerotidæ and Aritiledæ †
Eocene			* New forms		* True Squilla														
Probable Interval																			
Cretaceous																			
Jurassic																			
Triassic																			
Permian or Dias																			
Upp. Carboniferous																			
Low. Carboniferous																			
Devonian and O.R.S.																			
Upper Silurian																			
Ordovician																			
Unconformability																			
Cambrian																			
Unconformability																			
Keweenawan																			
Huronian																			
Unconformability																			
Contchiching																			
Laurentian																			

* and † indicate respectively the first and last geological appearance of the particular forms.
§ indicates the geological appearance and disappearance of a short-lived order.

Geological Strata.	Vital Parts encased in Carbonate of Lime.				Skeletons and Nerve-Matter Sheaths of Phosphate of Lime.														
	True Eyes.																		
	Molluscs (continued).				Vertebrates. Pisces (Fishes).														
Numbers of Species.		50000				None	None	None	None					None					
Recent	·	·	·		·	..	..	..	..	·	·	·	·	..	·	·	·	·	·
Eocene	·	* Aturia	·		·	..	..	·	..	·	·	·	·	..	·	·			·
Prob. Interval	·	..			·	..	·	..	..	·	·	·	·	..	·	·			
Cretaceous		.. ..		* Octopoda (incl. Octopus)	· ·	.. ..	.. ..	.. ..	.. ..	· ·	· ·	· ·	· ·	.. ..	· ·	· ·			
Jurassic	* True Nautilus	..	* Decapoda (incl. Squid)	..	·	..	..	..	..			·	·	..	·	·		* Isospondyli (incl. Herring)	* Aetheospondyli ..
Triassic	·	..	..	..	·	..	..	†	..			·	·	..	·			..	..
Permian or Dias	·	..	..	..			..		..				·	..	·		* Protospondyli (incl. Bony Pike) ..	..	..
Upper Carbon.	· ·	.. ..	.. ..	.. ..				* Ichthyolomi	- †				·		·		.. ..	.. ..	.. ..
Lower Carbon.	·					† [Ostracodermi]	§ [Proselachii]												
Devonian	· ·	..	..	..		·	..	..	* Acanthodii	* Asterospondyli (incl. Sharks) ..	* Texospondyli (incl. Devil-Fish) ..	* Chimaeroidei (incl. Skate)	* Sirenoidei	* - † [Arthrodira]	* Crossopterygii	* Chondrostei (incl. Sturgeon)	..	..	..
Upper Silurian	·	..	..	..	* Marsipobranchii (incl. Lamprey)	*	..	..	..	..	..	..	..	..	..	..	..	..	..
Ordovician	·																		
Unconform.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cambrian		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Unconform.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Keweenawan	* Nautilus, old forms	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..
Huronian	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Unconform.	..	..	..	..	..	..	·	..	..	..	..	..	..	..	..	..	..	..	..
Contchiching	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Laurentian	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..	.. ..

* and † indicate respectively the first and last geological appearance of the particular forms.
§ indicates the geological appearance and disappearance of a short-lived order.

Geological Strata.	Skeletons and Nerve-Matter Sheaths of Phosphate of Lime (continued). True Eyes (continued). Vertebrata (continued). Pisces (Fishes) (continued).			Amphibia.			Reptilia—Reptiles, Air-breathers.										
Numbers of Species living - -		12000		None			None	None	None		None	None		Node		None	None
Recent - - -	.	.		. .			. .	. .	. .	.	. .	. .	.	. .	.	.	. .
Eocene - - -	.	.	* Modern Fishes	. .	* Caudata	* Ecaudata	. .	. .	. .	.	. .	. .	.	. .	.	. .	. .
Probable Interval			. .	. .	. .	. .	. .	. .	. .		. .	. .		. .	.	. .	. .
Cretaceous - -	* Permocorphi	* Apodes (incl. Eels)	. .	. .	. .	. .			†		†	. .		†		. .	†
Jurassic - - -	. .	.	. .	. .	. .	. .										. .	
Triassic - - -	. .	. .	. .	†	. .	. .	† [Anamodontia]	§ [Placodontia]	* Sauropterygia	* Chelonia (incl. Turtle)	* Ichthyosauria		* Crocodilia (incl. Crocodiles)	* Dinosauria	* Squimata (incl. Serpents)	Rhynochocephalia †	* Petrosauria
Permian or Dias - -	. .	. .	. .	Labyrinthodontia	. .	. .	*	. .	. .	. .	. .	§ [Protosauria]	. .	. .	. .	*	. .
Upper Carboniferous -	. .	. .	. .		. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Lower Carboniferous -				*													
Devonian and O.R.S. -	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Upper Silurian - -	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Ordovician - -																	
Unconformability -	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Cambrian - -	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Unconformability -	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Keweenawan - -	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Huronian - -	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Unconformability -	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Contchiching - -	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .
Laurentian - -	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .

* and † indicate respectively the first and last geological appearance of the particular forms.
§ indicates the geological appearance and disappearance of a short-lived order.

Geological Strata.	Skeletons of Nerve-Matter Sheaths of Phosphate of Lime.																Totals of Maximum Thickness of Strata.
	True Eyes (continued).																
	Vertebrates (continued).																
	Aves (Birds)			Mammalia.													
Numbers of Species living	None	14000		4	156						1000				270	1	Feet
Recent	..	-	-	-	-	[Edenata]*-	[Cetacea] * (Whales)	[Sirenia] *(Dugongs)	[Ungulata] *(Hoofed)	[Rodentia]* (Rodents)	[Chiroptera]* (Bats)	[Insectivora] * (incl. Moles)	[Carnivora] * (incl. Walrus)	[Primates]* (incl. Monkeys)	[Man]*	0
Eocene	..	-	* Ratitae -	-	-											20,000
Probable Interval	§[Saururae]	* Carinata	..	* Marsupiatia -	* Monotremata -	..	..	..	..	..	..	..	..	..	..	40,000
Cretaceous	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	60,000
Jurassic	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	90,000
Triassic	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	109,000
Permian or Dias	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	127,000
Upper Carboniferous	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	151,000
Lower Carboniferoüs	..	..	..	..	..	..	..	..	.	..	..	..	..	..	..	180,000
Devonian and O.R.S.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	190,000
Upper Silurian	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	206,000
Ordovician	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	230,000
Unconformability	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	244,000
Cambrian	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	264,000
Unconformability	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	282,000
Keweenawan	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	302,000
Huronian	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	352.000
Unconformability	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	370,000
Contchiching	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	390,000
Laurentian	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	410,000
	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	430,000 or more

* and † indicate respectively the first and last geological appearance of the particular forms.
§ indicates the appearance and disappearance of a short-lived order.

EVOLUTION.

A PERUSAL of the previous chapters on geological records and a study of the palæontological table by which it is accompanied will have given an idea of the vastness of the present subject and the extremely fragmentary data on which its study can be based. It is difficult to suggest, except vaguely, what is the nature of Evolution, this most marvellous manifestation of energy. A feeling may have grown that Evolution means merely constant changes, but there is method in these changes, and their nature will perhaps be best understood by a brief reference to embryology which, like palæontology, concerns itself to a certain extent with the past conditions of genera, species, etc.

It has long been noticed that the embryo of mammals have gills, like fish, and that when these close up during development, primitive lungs and other organs develop, including the limbs, while in the case of most mammals the body gets covered with fur, which on the human fœtus again disappears before birth. Many other minute changes are noticed, and these may unhesitatingly be said to indicate that there is, as it were, a double current in Evolution. The life principle is represented by millions of living beings constantly pouring out through the portals of life into the world, while the evolutionary principle, the change of form, rolls inward, just as water, the substance, is constantly flowing out of the mouth of a river into the sea, whereas the tides and the waves of the ocean, mere forms, roll up stream.

There was a time, no doubt, when the ancestors of the human race were throughout life covered with fur. This may have been an insufficient protection in the cold

weather regions to which they may have been driven, perhaps by the agile apes. A power common to most mammals, including the whale and the pig, of developing thick layers of fat under the skin may have come into play amongst the older individuals of each generation. In fact many old people of to-day grow very fat and might with no inconvenience to themselves walk about naked in almost any weather. To them a fur covering would have been not only a superfluity, but also an impossibility, for fur does not seem to thrive well in a skin of fat. The bristle, more particularly at the joints of the limbs, where with all animals, fur is scarce, seems to have been more firmly established and has survived. Gradually, this tendency to develop obesity may have extended to the young. Precocious children of old parents will have been born who lost their fur and grew fat like their elders, but at an early age. Soon, perhaps, only new born babies would possess fur, as in the case of chickens before their feathers appear, and after a time, even babies would be born naked. They will have gained and lost their fur while still in the womb. Thus, although perhaps the very earliest mammals may have brought forth naked young ones which soon got covered with fur during life, the human race has so far developed that both these stages are now passed through in the womb, and the new born babe of to-day represents the fat and naked elders of a recent past, while the fur covered embryo represents the fur covered individuals of a more distant period. The form, as it were, rolls slowly inward against the emerging stream of individuals. It is on these lines that embryology has successfully established a few genealogical trees.

Is not this evolutionary activity an analogue of music in general? Is there not in every musical piece a flood of musical life which rises out of the depths of the bass and overflows into the realm of musical life, into the restless treble, like a mighty stream which pours its waters into the wave covered ocean? Are not the oceans the

outpourings of the rivers, in the same sense as the treble melodies are the amplifications of the bass notes? And, is it not the outer world, the environment, the super-development of the treble which steadily produces changes like the shiftings of sandbanks across river mouths, which slowly choke the natural flow and force the bass into new channels, into new keys and new rhythms? In those melodies, like the opening bars of Act III. of Lohengrin, where the bass is very prominent, the influence of the outer musical world on the fountain of its own life, of the treble on the bass, is very noticeable, but neither in this short passage nor in the longer and more elaborately developed symphonies is the analogy complete, for whereas in music 'motives' may die out and re-appear over and over again, in Evolution any form of life which has changed or vanished never comes back again.

Embryological studies, assisted by opportune geological finds have revealed the relationship of the rhinoceros, the tapir, and the horse, and gradually no doubt, many similar relationships will be revealed, but from what has been said in the chapter on geological records, it is exceedingly doubtful whether any indication of the actual shapes of common ancestors, the so-called missing links, will be found. The chances are that in most cases these common ancestors were small insignificant things which grew hardy and resourceful under adverse conditions and amidst large and powerful enemies, and only when favourable opportunities appeared did they rapidly develop both in numbers, types and sizes.

It might, for instance, seem a great disadvantage for animals like the mammals to have to carry their young about instead of leaving them in egg shells in the sand, and during the Triassic age, amongst the enormous reptiles of the day the small prototherians, the lowliest class of mammals, will have led a very unsafe and unsatisfactory existence. But supposing that either birds or other animals had discovered means of finding and consuming

the hidden hard shelled eggs of reptiles, then these animals, at least the larger ones, would rapidly be exterminated, whereas the persecuted mammals who brought forth their young alive and suckled and tended and defended them in youth would, for a time at least, lead a most secure and comfortable existence. As a natural consequence they would rapidly diverge into numerous families and species, until amongst these again the carnivora for instance, would do their best to exterminate the rest. Possibly, too, the reptiles may have been exterminated by a microbe which was able to flourish in their blood, but which could not live in the much warmer blood of mammals and birds, in the same way as nowadays the innumerable parasites in the bodies of fishes are unable to thrive in the warm flesh of the mammals. Only recently, innumerable ungulates died in Africa through the introduction of the rinderpest, and now that the tsetse fly has been found fossil in the tertiary rocks of America, the suspicion is justified that the extermination of the horse and many other large animals of that Continent was due to the microbes which that insect seems capable of carrying about. Only the bison, which was able to live in cold climates where the tsetse fly could not exist, has survived.

Evolution, like other manifestations of energy, embraces as it were all its lower forms, and in the same way as the cell energy employs external powers to carry out its own wishes, chiefly the multiplication of cells or their modification, so does Evolution employ lowlier forms of energy, including, of course, the whole phenomena of organic life in furtherance of its great object, improvement. It is therefore impossible to say along which lines it acts, there are so many, and in turn no doubt each one may have been employed. It is, for instance, not correct to assert, as is so often done, that Evolution is brought about by the survival of the fittest. Darwin looked on the process which he named the survival of the fittest as one

of the many means employed by Evolution, but that does not exclude mutation and many other means. Yet controversies on this subject reveal that only too often the disputants are unable to grasp the possibility of more than a single idea. Generally, too, experimental information is wanting. From Mendel's experiments on peas and a few others on small animals, which tend to show that there is a certain mathematical regularity in the irregularity of the colouring of products of crossings, the conclusion seems now to be drawn that even the strong characteristics of living organisms can be calculated by the same mathematical formula. This means that no child can have a characteristic which was not possessed by some ancestor, no matter how far removed. That would lead to the conclusion that each of the 400,000 living species has been separately created, which sounds like denying the truth of Darwin's discoveries. Not only is this unreasonable, but far too much importance seems to be attached to Mendel's observations. After all they only deal with colours and other marked but unimportant details and occur almost exclusively with crossings of domestic plants or animals but not with different breeds of wild animals, whose purity of strain may perhaps be based on a thousand generations instead of on only a dozen, which for our breeding purposes, is looked upon as a thoroughbred condition.

Another view about Evolution is that environment or external influences, affect successive generations to such an extent that it may ultimately lead to the formation of distinct species with new characteristics. This is Lamarck's idea and amongst those Darwinians who refused to admit that Evolution makes use of any other powers than the survival of the fittest and natural selection, this older suggestion, without which however improvement of race seems inexplicable, is treated as being a heretical doctrine.

It does at any rate seem permissible to expect that

very highly developed and especially nervous organisms would readily adapt themselves to changes of environment, but with them the intervals between successive generations are rarely less than one year, and, if it should require 1,000 or 10,000 generations to produce a new species, we with our short lives have no opportunities of testing the correctness of Lamarck's views. Some light might, however, be thrown on this subject by studying micro-organisms under changes of environment, for although their nervous appreciations of changes may be very faint, some at least of these organisms are physically very sensitive. Thus the small-pox microbe, although it thrives luxuriously on human beings, will not live when transferred to a cow. Syphilis too thrives, so it is said, only in human beings and in some nearly related apes, but not in other animals, and yet its power of living in congenial environment is so great that it can be eradicated out of the human system only by such powerful poisons as mercury, and, according to modern researches, by arsenic, which has however to be specially prepared so as not to kill the individual.

It is amongst these micro-organisms that the changes expected by Lamarck, due to change of environment seem to have been produced. Thus under certain conditions small-pox has after many transplantations been known to lose its virulent nature to such an extent that in former days, before vaccination with cow-pox was invented, this mild species was used for inoculation purposes. Under other environments small-pox proper has been changed into malignant, confluent, and hæmorrhagic small-pox. Then again cow-pox, when inoculated into human beings, produces very serious ulcers, and it is only after several re-inoculations in the new—human—environment that the mild species of vaccine microbe is evolved, which was formerly the only one used in practice. A similar modification can be produced by inoculating calves with cow-pox, but strange to say the resulting calf vaccine is

distinctly different from the human one. In this example we have one species of organisms modified by environment into two others which when placed in the same environment—human body—are not identical. Other cases might be mentioned in support of Lamarckism and more convincing results may perhaps be obtained if sought for.

These few remarks about the different views which prevail about Evolution, and there are many more, indicate not only that little is known about its methods and that possibly, as already stated, its methods are innumerable. It is also clear from the preceding chapter, that little is known of the history of Evolution. Part of the fragmentary history is contained in the palæontological table of the last chapter, but as it is tedious work to wade through tabulated matter, a few words will here be added giving, not a sketch of what seems to have occurred in past ages, but a brief note of an imaginary race towards perfection between the articulata and the vertebrata, treating each of these branches of the animal kingdom as powers endowed with definite evolutionary aims.

Supposing that both vegetable and animal life started with water for its element and that animals fed on plants, then if certain plants left the water for the land and air, they would have the whole world to themselves, and even if they were of the lowliest type they would thrive and spread themselves over the surface of the land. At first, at least, these plants would have primitive functions, there being no animals to destroy them. Gradually some animals, for instance insects, would be endowed with the power of living above water, and as soon as they had acquired the power of crawling and walking and had adapted their digestive organs to surface plants, they would, finding abundant food, increase amazingly. On account of this persecution, plants with more specialised forms and functions, armed

perhaps with thorns, poison, etc., might even at that early date have come into existence. Simultaneously newer and newer forms of animals would grow out of the older ones and probably the power of flight, which is of such great assistance in searching for food, will have been acquired at an early period, especially if no birds had yet come into existence. Occasionally, as when the graphites of Canada, and more recently the coal measures were built up from the decay of luxuriant vegetation, the previously existing carbonic acid of the air, by being reduced to carbon and oxygen, will have brought about changed conditions in our atmosphere, and those animals which could not adapt their constitutions will have died out or will have returned to the water where oxygen is always scarce. A most wonderful method of adaptation was at that time evolved amongst some insects which during one portion of their lives live under water and during another portion in the air.

In the meantime, the vertebrata were being evolved in the oceans, improving, perhaps, through fishes towards the reptiles. The oxygen, which was in the meantime accumulating in the atmosphere, offered a wonderful supply of life energy, and lunged animals when once they made their appearance would rapidly develop. Not only would the breathing of the air endow these animals with superabundant energy, which in turn would favour evolutionary processes but the delicious insect food, which formerly could only be snapped at occasionally, as is now done by fishes, would be ready to hand in myriads, and reptiles have certainly retained a taste for insect food up to this day. Under such favourable conditions, the development of breathing power in vertebrata might be expected to be very rapid, competition amongst them would not, as yet, be serious, and early attempts to fly after winged insects would not be baulked by large enemies. At any rate, feather and toothed birds have been found together with the earliest reptiles and are so

similar to these in many respects, that they are considered to have been evolved from them or from a common stem. Thus almost at one bound, as in the case of insects, vertebrata will have left the watery elements and passed first to the surface of the earth and then into the air. Mammals made their appearance at a later period, and it is almost natural that with the long established reign of birds in the air flight competition will have been difficult and therefore only one attempt in that direction has succeeded, but that too was a very early one, the bat appearing in the lower Eocene strata.

The case of birds is instructive in other respects. Few fossils have been found, but these indicate that this class of animals was rapidly evolved and perfected. Energy was now tied to so little matter that it could soar into the air. The highest form of life energy appeared to have been reached and further advance seemed impossible but then things became stationary in the same way that they had become stationary with insects, and for countless ages, as congenial food grew scarcer, and birds even preyed on each other, energy, having now as it were quite despaired of success in this line, evolved newer types of birds which gave up flying and preferred to walk; in others even the wings were converted into fins, and descent after food was made back into water, the primitive element from which Evolution had once raised birds into the air. Some air breathing animals, the whale, the dugong, the walrus, the seal, the beaver, and others have also returned or are returning to the waters.

How encouraging must have been the prospect of succeeding to be freed from inert matter, when among the articulata, insects had been evolved which lived occasionally under water, under earth, and then in the air. Again, how promising must have been the first developments of instinct, how advantageous to life and development that the experience of the past generations should be transmitted to future ones. Possibly, but this

can never be known, instinct may at one time of the world's history have been infinitely superior to anything that is known about it now, its development may have been as rapid as any other evolutionary achievement, but the stagnation period set in, and though one marvels at the instinct of the bee, we reasoning beings smile to think how vastly superior is reasoning power, a comparatively recent result of evolutionary striving.

Many of the strivings of Evolution, being of an unconscious nature, frequently defeat themselves, as do even the conscious and slowly reasoned aims of thinking man. This may be illustrated by something similar in chemical energy, when as already mentioned it produces crystals; a finality seems there to have been reached which is diametrically opposed to the aims of energy. Energy strives to be liberated from matter, not to be buried in it. Thus what may be called carbon energy in diamond crystals has become carefully imprisoned for millions of years in the hardest of known substance, but no sooner is the diamond heated and burnt, than the prisoner, seizing its chance of being liberated, joyfully welcomes the consuming oxygen and travels away.

In Evolution, more perhaps than in any other manifestation of energy previously dealt with, a glimpse is afforded of its real nature. A striving is noticeable which is steadily though unconsciously directed towards one object, it is the object to which every individual, either plant, animal, or human being is also striving, an object therefore which is looked upon as a good one and to which human beings have given a name which implies praise: "Improvement." Energy, as it manifests itself in Evolution, aims at improvement, aims at increased specialisation of itself, aims at producing the greatest possible effects with a minimum of sluggish matter, in other words, it aims at economy in the highest sense of the word. Economy, therefore, and improvement are very nearly related. The employment of too much

matter, all real waste of energy, all reduction of a specialised energy such as life, to lower forms such as chemical energy or putrefaction seem to be contrary to its true spirit. This may account for the horror which living beings have of death. The expenditure of energy, when this results in increased specialisation of itself or of the remainder, seems always to be in full harmony with what can be learnt of the strivings of energy. Evolution would, as it were, approve of the destruction of tons of rose leaves for the resultant drop of perfume. Untold generations of innumerable forms of life seem to have been sacrificed in order that the surviving ones of to-day should come into existence, and that they should be more highly specialised than any of their ancestors. The instinct of the bee, and the abstract reasoning power of man are the result of this striving. In this evolutionary striving may perhaps be found the popular justification for the sacrificing of millions of lives in the furtherance of ideas, for they, as will be explained further on, seem to be a still higher form of energy than life. When an idea represents improvement or economy, no sacrifice of lower forms of energy, even of life, seems to be too great. Public opinion, at any rate that of the generations which follow, condemns other equally intense efforts which have been made towards the furtherance of such ideas, if they have proved themselves to be wasteful, reactionary, and inefficient. It is strongly felt that the results of wrong efforts, if they have been attained, will not be permanent, they seem to be contrary to the everlasting striving of energy, towards economy of matter, and towards improvement, and will sooner or later be nullified.

NERVE ENERGY.

In the last chapter Evolution, perhaps the grandest manifestation of energy, has been briefly reviewed. The persistency with which, in this form, energy seems to be striving towards some objectives is there revealed more strongly than in any other example which might be adduced and so is the nature of these objectives, which seem to be to economise matter, and to specialise energy into a higher form, one which shall have the power of directing all other less highly specialised manifestations of energy into carrying out its aims. In following this aim Evolution has been wonderfully successful, even in the perfection of its tools, and of these none can claim a higher position than nerve power in its three forms, Reason, Memory, and Instinct. It is in these forms that energy attains both the power of contemplating itself in its varied forms and the capability of acting on reasoned lines. Thus nerve energy, although one of the products of Evolution, develops a new characteristic which has the semblance at least of being superior to the blind unreasoned striving which is noticeable in Evolution.

The reason of man, and the instinct of insects, can combat and destroy enemies which bar the way to progress, or they can open out fields of development in a manner which is quite beyond the power of Evolution alone. Hundreds of thousands of years may have elapsed and thousands of races may have perished under the attacks of tropical diseases, *i.e.*, of microbes, before the fairly immune negro race was evolved, whereas when Caucasians, who used to die off like flies in the tropics, suddenly grasped the nature of the enemy, they introduced

hygienic improvements. More recently, since flies and insects have been discovered to be the carriers of diseases these are also being dealt with. Another example is the invention of weapons with which to combat wild beasts that once kept down the sizes of flocks and of populations.

Thus, although nerve power is but one product of Evolution it deserves more attention than its sisters. Memory and instinct should have a special claim on us because they recall the analogy on which these considerations are based. Music may be said to be idealised memory, or memory without brain matter, in so far as that each note is conditional, not only on the notes immediately preceding it, but also on others which have been sounded long ago. Thus the various parts of a symphony are related, the one part remembers as it were what was played in a previous one, and it is therefore only natural that great composers should have prodigious memories. Mozart, when only 14 years old, after but once hearing the Miserere of Gregorio Allegri, was able to write it down at home; Schumann felt his music as a whole and wrote it down without altering it afterwards. How wonderful do these memory gifts of musicians appear to ordinary and less fortunate mortals, who can at best remember a few bars of tunes which may have been played or sung over and over again.

Different brains remember different objects. Orientals, and amongst ourselves, those individuals who excel in examinations, rise to eminence in the Church, at the bar, and in politics where the remembrance of words is all important. Long speeches carefully prepared and learnt by heart are their forte. Lord Dunraven mentions that he learnt by heart his five hours oration on the late Prince Consort, and a modern meteoric politician glories in the ability of surpassing a parrot, handing his written speeches to the reporters who can convince themselves by listening that he has learnt every word by heart.

Some men remember figures, dates, etc. The late Mr.

Bidder had this gift. Amongst his vast store may be mentioned that he knew by heart the logarithms to eight places of decimals of the first hundred prime numbers, and he either knew instinctively or he recalled with barely any effort the prime factors of any number that might be mentioned to him.

Then there are mathematicians who remember all the wonderful formulæ which their brethren have invented or built up.

The great musicians, as already mentioned, have a wonderful memory in their own line.

Some people have a wonderful memory for faces and a fewer number for faces and names. This is said to be a princely gift and it certainly gives a wonderful advantage to its possessor if his aim is to influence mankind.

Other people remember localities and never go astray in a place through which they have passed but once in their lives.

Eminent engineers and scientists have generally excellent memories as regards objects and constructions in which they are interested.

On examining the subject it will be found that one remembers two things, either mere words and facts or one's own actions. Thus some people can recite pages which they have read through in silence, others have to repeat them aloud, the latter class remembering as it were only the action of their tongues. Some musicians remember melodies which they have only heard, others remember as it were only the actions of their fingers, and merely repeat what they have done before. Some artists remember a face or other object sufficiently well to draw or paint it, others, this is said to be the artistic method of the Japanese, draw a picture over and over again until they know their drawing actions by heart. One may perhaps say that the memory which remembers the essence of things is a gift, capable of improvement no doubt but still a gift, whereas the remembering of one's

own past actions is rather an accomplishment. Walking, the repetition of former movements of one's legs is an accomplishment. One's legs are moved as they were moved before, not as others have been seen to move theirs.

Some gifted individuals can watch an artisan and go home and do his work; such people have good memories, most people, however, having seen a man use a hammer will on a first trial hit their own fingers, but if they try again and again they will remember their own actions and will thus have acquired an accomplishment. Even the accomplishment of one hand cannot be conveyed to the other hand without practice. It is ridiculous to think how awkward one feels if the knife and fork are used by the wrong hands.

Accomplishments, if they are to appear perfect must be produced, as it were, instinctively. If a vocalist were to think of voice production, if a violinist were to think of his bowing and fingering, then their performances would be failures, their productions would be laboured, they would not be natural, not instinctive. A good fencer must have a quick eye, but he must also have practised the blows, parries, and thrusts in all the numerous orders in which they can follow each other. The parry must be made instinctively after his own blow and in anticipation of the only blows with which the adversary can reply from the guard into which the attacking blow has forced him. When the adversary waits so as to be able to strike any one of all the possible blows, then reason has to come to the rescue, but safer it is with such an adversary to strike again and again so as to force him into definite attitudes from which only particular blows are possible. All this should be done instinctively so as to leave to the reason full freedom to control the general attitude.

It thus appears that it is perfectly correct to say that accomplishments are of the nature of acquired instincts.

Now instinctive actions, as opposed to reasoned actions, seem to be carried out with a minimum expenditure of nerve energy and possibly for this reason are carried out with exceptional speed and great certainty. There is no asking why and wherefore. A speck of dust may fly into the eye which instinctively shuts, one does not consider, if one is perched on a bicycle, that the consequence may be a fall; the eye closes instinctively as it has been closed thousands of times before. This is not a real instinct, for babies do not close their eyes, neither when dust flies into them nor when the sun stares them in the face. The sudden blinking of the eye is an accomplishment, an acquired instinct which has to be seriously repressed when boxing, fencing, bicycling, etc.

Bicycling illustrates this subject very clearly. During his first lesson, the novice is told to hold the handle bar lightly and not clutch it, for it is not there to support him. He has to turn the pedals with the feet, and each time that he feels himself falling to one side or the other he has to steer for that side, so that the centrifugal action may pick him up. He should also increase his speed on these occasions. Half an hour's attempt to carry out these varied instructions leaves the novice in a state of mental and physical exhaustion not easily forgotten. During the first lesson every action has to be thought out, the brain is generally too slow in its action and does not decide in time. After a few days' repetition the instinct department of the nervous system seems to have attained control of the new actions, the learner manages to balance himself for short distances, turning the handle to right and left as required without being even conscious that he has been falling over, first to one side then to the other, and that he would have fallen if he had not turned the handle this way and that. Evidently the instinct department has relieved the reasoning department of this consciousness. But the brain is still seriously concerned with some movements and has therefore no time to control

the general direction, with the result that the learner travels with no other aim than that of balance and would, without a teacher, run into all sorts of obstacles. Soon, however, the instinct attains more complete control of the movements and the brain is now free to indicate directions so that the bicyclist can observe surrounding objects perhaps even look behind, can talk, and if he is expert enough he can now balance himself without holding the handle bars and even with closed eyes. The individual or rather instinct department of the brain remembers all previous movements and causes the accomplished rider to repeat them. This remembering of previous actions is what constitutes accomplishments.

In natural or inborn instincts the memory goes back to past generations, in acquired instincts or accomplishments it does not extend beyond the individual life. The seat of abstract reason is said to be the brain, the seat or seats of the instincts are said to be the ganglia, miniature brains or knots of nerve matter distributed throughout the body. There is of course no reason why parts of the brain should not be of the nature of ganglia, nor why parts of the brain may not by exercise be converted into ganglia. Certainly some individuals are personified accomplishments and one wonders whether any parts of their brains are capable of reasoning.

Contemplating this very wonderful subject from an outside point of view, for scientists are unable as yet to afford an insight into the activity of nerve action, it must be felt that if instincts are really localised in one or more ganglia both in the body and in the brain, then the structure of these ganglia, their folds and interlacings is as much the instinct, as the complicated combination of wheels in a watch is the time keeper, just as the pipes or reeds, the pronged disc or drum of a musical box and the markings on the wax cylinder or disc of a phonograph are the music makers. But these musics, these time-keepings come into existence only when a driving power

is applied, and similarly instincts only exist when the bodily energy drives the ganglia to act.

The instinct of a fly brings into unreasoned but orderly successive action a number of nerves which excite the muscles and cause the wings to move rapidly in a particular way, as yet unknown to scientists, which is called flight. Similarly the main spring of a watch causes motions successively in the balance, the lever, the escapement and in the train of wheels leading to the pointers which indicate the time.

If then it be assumed that the structure of the ganglia which like other parts of the body take their definite shape during growth, is the mechanism of the instinct, and if oft repeated actions become acquired instincts or accomplishments and are then of course not reasoned actions, it may from an outside point of view be assumed that oft repeated efforts in one's brain and nervous system do result in the structural re-arrangement of a small portion of its matter, and this re-arranged structure is the mechanism of the newly acquired instinct or accomplishment.

The brain having converted a portion of itself into a separate department or sub-committee on one particular subject, which is henceforth controlled as automatically and correctly as any Government Department, finds its other portion free to carry out the larger duties of abstract reasoning without being bothered when accomplishments have to be repeated. It would follow that an individual with many accomplishments has converted most of his brain matter into memory mechanisms or receptacles, and little brain matter would be available for reasoning processes. A man with a small brain who has set apart one portion for the walking movements, another for the talking movements, and others for the accomplishment of knowing thousands of lines of the classics by heart, has perhaps no brain matter left with which to carry out the process of reasoning. Such people

are met with every day. The early school training of only to remember and never to reason has generally driven these men into employing only their memory powers. They seem unable to reason in cases of difficulty, and unless they remember what they did on a previous similar occasion, or how others have acted, they feel perfectly helpless. Generally they act on definite principles and these have to be of the simplest. Those who do this to excess are called cranks and faddists. Some people never drink on principle, others never refuse a drink on principle. Some are honest because it is the best policy, others are dishonest also on principle. This practice of not reasoning, but of relying only on memory extends of course into the domains of politics and religion, and explains why arguments have there so little effect.

The actions of men who live on definite principles are of the nature of accomplishments. One cannot argue with an accomplishment, one can at best only excel in it. If a man after some considerable mental effort has acquired the accomplishment of balancing himself on a bicycle, he will, without having to reason, turn his handle, ever so slightly from right to left each time that he tends to fall one way or the other. These recovering movements are gone through instinctively, they have been done before and are being done again, and few people know that they are doing anything but merely wheeling, though looking at a bicycle track, its persistent waviness, shows what has happened. Now get a friend to reason with this accomplished person, telling him that he need not hold the handle, that the fork of the bicycle is so constructed that any side movements of the body will turn the front wheel as required. Is it reasonable to imagine that this argument can possibly affect the person's accomplishment? He has for years steered his bicycle by hand on definite principles, instinctively, unconsciously, just as he has voted for one political party unreasonably. If he adopts the suggested new method of steering it will

only be after a period of practice, not of arguing. He will have to use his brain again, as he had to do when he first learnt to cycle. Similarly the man who acts on principles will not change these by arguments, he must use his own brain first, he must practise the desired accomplishment, the new political view. He must learn to argue as his would-be converters argue, he must for a time duly read their papers until he feels that he is an accomplished disciple of the new creed. Principles called etiquette regulate our social actions, business principles regulate professional actions, principles in the form of rules govern our games and recreations. Why must everything be done by memory? Why not give the brain a chance of reasoning? Why not encourage a little study, scientific, historical, political? Why not leave something for the reason to do?

All these considerations lead to the conclusion that our nerve power is a dualism consisting of reason and instinct, and that these touch on a broad boundary line called memory. The memory portion nearest the intellect remembers events, that portion nearest the instincts reproduces past actions, even actions of past generations. Now if it could be shown that brain efforts can modify the structure of portions of the nervous system so as to make these the mechanisms of our acquired instincts, of accomplishments, one must assume that these portions are of such a constitution that they are easily changed. For instance, the set of nerve knots or ganglia which regulate the action of men's legs in such a manner as to enable them to walk, must have grown with the body and must have had a predisposition to undertake these functions. The ganglia or portions of the brain might be likened unto small packets of wheels which only require to be placed against each other so as to produce some sort of clock motion. Something similar happens in reproduction. The egg contains a certain amount of wonderfully prepared matter which is predisposed towards

development into a chicken but the final work of organisation is initiated or entirely carried out by the male spermatozoon.

Similarly, certain portions of the nervous system are predisposed to be rearranged in such a manner as to enable it to carry out movements instinctively. The brain takes the place of the spermatozoon, but in a clumsy way. For instance, in bicycling it causes our limbs to go through certain movements, the ganglia grasps what is wanted of them, and at once a reorganization, perhaps structural as in an egg takes place, which rapidly leads to full development. Now, if brain efforts can initiate developments in ganglia favourably disposed thereto, is it not reasonable to suppose that similar brain efforts on nerve matter which has not the same predisposition, will have the double effect of causing the best possible re-arrangement, and of accentuating the influences which particular ganglia have on the reproductive organs and thereby increase in future generations, the predisposition to acquire accomplishments. The present tendency of biologists seems to be strongly opposed to this view, but the arguments in its favour seem so strong that they may at least be placed in the balance against expressions by certain schools of thought.

One sees that repeated mental efforts effect changes in the instinct departments of the nervous system. Why then should not such mental efforts also affect these portions in such a way, that their share of influence on the future generation should lead to a predisposition for such parts to submit more and more easily to the changes which the brain may find it necessary to make. In other words, why should not the predisposition for accomplishments be heritable? One may even go a step further and ask whether the mental efforts of parents do not intensify in their children their own predispositions for certain acquired instincts.

It is well known that efforts which some people make

in their professions sometimes have elevating influences, but more generally may lead to depression and affect the digestion, circulation, etc. The nervous system may suffer, in extreme cases the constitution may be shattered. Now it is unreasonable to suppose that personal efforts, either in music, business, scientific pursuits, handicrafts, which can be shown to have a powerful effect on the nerves, the heart, the liver, kidneys, and other glands should not have an equally strong effect on the reproducing glands, on the male spermatozoa and on the female ova. If that be so, and there can be little doubt on this point, then the child which was conceived during the height of these nervous influences, should be affected by them as it is affected even unto death by the disorganisation produced by illnesses. It is known that the microscopic agencies of reproduction can transmit the most trifling characteristics, and even habits of the parents, why then should the idea be rejected of their being able to transmit an intensified predisposition for those acquired instincts or accomplishments of the parents on which they may have been relying for a livelihood?

It is impossible at present at least to test this suggestion, but the general public accept it instinctively, in spite of the views of some scientists, and in those royal houses it is believed in implicitly where the succession of the throne falls to the oldest male who has happened to be born in the purple. Even some of the German emperors held this view, which is perhaps not so unreasonable as it may appear. The children of a prince without occupation, in exile or perhaps in an Oriental prison, would not naturally be chosen as rulers, for they would in the people's mind not have those royal instincts which their younger brothers might have who were born after a revolution had taken place, by which their father was raised to the throne.

The general public readily assumes that the son of a blacksmith is likely to excel best in his father's business,

that the daughter of a lace worker would do better in her mother's trade than in the musical line, that children of musicians are more likely to be artistic prodigies than those of monotonously plodding bank clerks. Children certainly have special aptitudes for particular professions and accomplishments, and the tendency to acquire these must, one would think, have been inherited from parents.

It is possible of course that a blacksmith may hate his profession, attribute his want of success to his having been put into the forge instead of into the farm yard. Those of his sons who are conceived while these thoughts supervene may be expected to develop a tendency for any trade but that of Tubal Cain. Who can tell? Even the parents themselves cannot say what were the hopes, the despairs, the longings or antipathies which possessed them a few months before conception. They will not divulge, or have forgotten these secrets of home life, but in many notable cases internal influences seem to have been at work. Mozart's parents were both musical and not well off, probably both had hoped for greater successes if the husband could but have improved his only accomplishment. He did improve it, though not in himself, but in his son, who was the musical prodigy not only of his own age but of all ages. Napoleon, whose date of birth is, however, doubtful, is sometimes cited as a case in point, both parents having been attached to a field force before and during the mother's pregnancy. Many other cases might be mentioned in favour of this argument and some against it, but in the latter cases it must not be forgotten that few people are content with their lot, and many may have passed through prolonged periods of loathing for their profession and surroundings. The chance factor must also not be left out of sight, for of the thousands of spermatozoa which surround one ovum, and which may be very differently constituted, only one gets absorbed.

It is, however, not well to rest content with a few

special cases, a glance should at least be directed towards average effects, as exemplified for instance by tribal and national tendencies.

A great calamity, a great idea, which afflicts a people, ought, if the above view be correct, to have an influence on the character of the children, and should make itself felt at the time when they attain the age at which they become true members of the State, say at about thirty years. The feeling on this point is fairly strong and even recently the French revenge for Sedan was expected about thirty years after 1870, but averted because it was prepared for and even encouraged. The 1848 Revolutions followed about thirty-five years after the great European convulsion against Napoleonic oppression. The French Revolution may be traced to Rousseau's and Voltaire's writings, though both men belonged to the previous generation. That Huss followed thirty years after Wycliffe is perhaps a mere coincidence, but the Hussite war gained strength about twenty-five years after he had become the idol of his people. Luther started the Reformation in 1517–21; in 1552 thirty years later the Protestant Moritz of Saxony defeated the Catholic Emperor Charles V, and forty-five years after Maximillian had first encouraged Protestantism, the Thirty Years War broke out. Then again the effect of that war was that the next generation which was sick of strife, mildly gave way to princely encroachment of public freedom, which culminated in the French Revolution. Education, as will be explained, may have its share in these effects, but intense feelings of parents are unquestionably also important factors.

A time may come when these various hereditary effects will be studied, for as yet the discovery of the evolutionary power is but half a century old, and our knowledge of its working is limited.

If all this be true, if nervous strain at the time of conception can have an effect on the qualities of future

generations, a time may come for societies to be formed, similar to the ancient Greek states, in which strict attention will be paid to the improvement of the race. It is to be hoped that whenever such an effort is again made enquiries into heredity will be bountifully encouraged, and that the even more important question as to what is perfection in man may not be settled definitely and dogmatically. At present each class and each tribe considers itself the beau ideal; princes wed only amongst themselves, and so do the nobility, naval men are a class apart. Those who have inherited the gift of growing rich only marry the rich, the industrious scorn to live with the idle, and the thriftless marry their like.

It has been suggested that the disposition towards acquired instincts is not only heritable but may be influenced by the life conditions of the parents, and that in time to come some acquired instincts might change into real ones, in fact walking and jumping are in some animals inborn instincts, for they are not taught by the parents, they come naturally; flight, however, except in insects, seems still to be an accomplishment, at least bird parents give lessons to their young in this art. These cases illustrate how real instincts may have grown. It is likely that in the most rudimentary nervous system there exists, or existed, at least one nerve centre which might be called a brain and of course one or more ganglia knots, for under changing surroundings an animal with only instinct faculties could not survive, some thinking would have to be done even if ever so little, until the reasoned actions had become acquired instincts, which process if repeated in successive generations would lead to a real or inborn instinct. Then the little brains could go to sleep again until a new change took place in the surrounding conditions.

Recently scientists have commenced to talk of germ memory; if such a power really exists it may be looked upon as the parent in an evolutionary sense of the

instincts, of memory and of reason. The highly specialised nervous energy, like all higher manifestations of energy wishes to economise, to dispense with superfluous matter or to utilise the available nervous matter to its fullest extent, and in reasoning beings this can best be done by delegating to the handy little instinct departments all those functions which they are capable of carrying out automatically. This department of the nervous system, either in the brain or in the ganglia has in animals been very active before birth, when reason and memory were as yet asleep and it is active throughout life. The first breath which a child takes is an instinctive action and so is every subsequent breath throughout life, say one to five hundred million repetitions. Sleep, too, might be called an instinct or rather its counterpart for waking first appears after the nine months sleep of the embryo. After birth many other real instincts make their appearance, the feeding instinct with its satellites, such as playing with the mother's breast and helping the flow of milk, come after a day's rest, then follow the instinct of play, the destructive or sporting instincts, the collecting and retaining or the business instincts. In some people these die out, in others they grow stronger in after life. Then also there is the mother's instinctive love for her child and more powerful than all others; sexual love. In addition there are our numerous acquired instincts for which at least the aptitude is heritable.

Newborn animals cannot walk, some can hardly crawl, but they are all endowed with an aptitude for learning either one or or the other form of locomotion more or less rapidly. Baby monkeys are gifted with precociousness as regards climbing; foals very rapidly learn to scamper about; chamois kids, when only two days old, are able to jump nearly as well as their parents; children learn to walk erect in about twelve months. The various animals are thus seen to be specially gifted for learning the particular form of locomotion in which their kind excel,

but walking, running, jumping are not instincts, they are accomplishments or acquired instincts, and so are talking, reading, writing, playing, fencing and all manual perfections.

There is yet another class of nervous activities of which it is difficult to say whether they are true instincts, acquired instincts, degenerated ones, mere aptitudes, or whether they are perhaps co-related to other instincts. Sometimes they are very persistent, reappearing without any perceptible changes in generation after generation, sometimes they are quite unstable merely appearing and disappearing in odd generations, sometimes they are of the nature of real instincts which make their appearance without apparent external cause, sometimes they are of the nature of accomplishments, the predisposition for acquiring them being there, but external influences being necessary to awaken them.

This class of nervous actions is best known as habits, both good and bad, and also as traits of character. It is a habit of some people to grin when excited, even if the subject matter be serious, some people reveal mental excitement by active movements of the fingers or of the feet, which is said to be a Semitic habit; some cannot hold their tongues when excited, while others grow deadly silent. Most people have particular habits of walking, talking, coughing, eating, and drinking. They themselves are unconscious of these habits, as they are unconscious of their real instinctive actions, but outsiders are not so blind and, as a rule, acquaintances and friends recognise each other's presence chiefly by their various habits.

These habits are very generally inherited, and octogenarians are fond of remarking on the great similarity of the habits of father, son, and grandson. A more definite test of inheritance of habits and characteristics is handwriting, which sometimes, but not always, is the same in

different members of the same family even though of different generations.

There are two habits or traits of character which are so nearly allied to instincts that they may possibly be real or degenerated ones. These are mimicry, including lying, and jealousy. Mimicry is certainly an instinct in some animals, and has been so highly developed that it has affected bodily shape and colours. Some butterflies cannot be distinguished from the leaves or barks of trees on which they settle, a tiger's stripes effectively hide him from view while stalking through moving reeds, the eggs and chickens of most water-fowl are almost indistinguishable from surrounding sand and stones, and many animals change their skin colour to suit surroundings, whereby dangerous enemies or wished for prey are misled.

Jealousy, too, is an instinct in some animals. Stags and horned cattle in general are subject to it during the breeding season, and in others, especially dogs and pigs, it appears during the feeding periods. It is strongly marked in some children and absent in others, but with them it may burst into energetic life when the individual is subjected to strong influences, such as love, desire of advancement, struggle for existence, etc. Whenever and wherever jealousy appears it has all the characteristics of a true instinct, of which one is that it prompts its owner to unreasoned but not necessarily unreasonable or harmful actions; on the contrary instinct in its own sphere of action seems to be as reliable a guide as if it were backed, as it doubtless is, by the experiences of thousands of past generations. A further characteristic of an inborn instinct and sometimes of an acquired instinct or accomplishment, is that it behaves as if it did not wish to be recognised, and willingly allows the intellect to appropriate the glory of its successful actions. This modesty is carried to such extremes that individuals in whom both instincts and intellect are

active, seem to be ashamed of the possession of instincts and to ignore and deny their existence. We sleep, some say, in order to recuperate ourselves, not because we are forced to sleep by an instinct which dates back to the Carboniferous age. We say that we eat and drink either to strengthen ourselves or to prevent ourselves from starving or because we have a fancy for certain dishes, not because the feeding instinct, which is as old as organic life, makes itself felt as hunger and thirst. We lie to ourselves when saying that we fall in love and are attracted to certain individuals because of their perfections, whereas the unvarnished truth is that we are under the influence of an instinct called sexual love; and women especially wish to be deluded into the belief that love is a Church mystery, a minor sacrament. An accomplished fencer, like a man awakened out of a dream, will with perfect honesty of purpose explain in detail how his finishing blow was led up to and how it was carried out, whereas as a matter of fact his long training of an acquired instinct prompted him on the spur of the moment to follow up his adversary's blow by the correct reply. Nowhere is this misleading tendency either of the instincts or reason more marked than with jealousy. A jealous person is the last to be aware of his or her condition which is patent to all onlookers, and it is only on rare occasions that, as an excuse for his past actions, a man pleads that he must have been jealous at the time.

IDEAS AND IDOLS.

WHILE contemplating energy in its various manifestations it will have been noticed that each one introduces new principles or powers; to a mere attraction, as in gravity, is added repulsion as in electricity and magnetism, to this is added trigger action, catalytic action, etc. In organic life and specially in Evolution the principle is introduced of utilising lower forms of energy for particular objects, and lastly in nerve energy, the power to contemplate itself is created. It will also have been noticed that with increased specialisation the disproportion between the energy manifestation and the amount of matter to which energy is tied seems to grow less and less. Nevertheless even Evolution is tied to matter in the form of the species and its tool, nerve power is quite obviously tied to a considerable bulk of material, to the brain and nervous system. At last, however, the goal seems to have been reached, for although reasoning power is tied to matter, the products of reason, Ideas, are apparently independent of sluggish matter. But no! Ideas as such are not energy, they rely for energy on what must now be called a lower manifestation of energy, on human beings. Without human beings ideas are powerless. Once more then, energy has failed in its seeming attempt to free itself from matter, but in doing so it has created gods.

Ideas are idols. One feels their superhuman power and imagines them to be superior beings. The grand ideas of the ancients were carved in stone. Their idea of fruitfulness was worshipped as Istar, Sirima Devata, Venus, Kali. Their ideas of the forces of nature were worshipped as Uranus, Neptune, Jupiter, Thor and others. War

paraded as Mars; Wisdom stood chiselled as Minerva; Poetry as Apollo; Joviality as Bacchus. Modern ideas are too young to be cast in bronze, but mankind has a longing to personify them. The newly discovered property of energy, called electricity, is lovingly associated with the names of Galvani, Volta, Ohm, Ampère, Faraday and others. These somewhat abstract ideas are worshipped as ardently as were the ancient idols. Most men and women bow down to the ideas of wealth and rank, distinction, birth and authority. In the eyes of various groups of men these ideas are all powerful, they are their idols. Like the gods of the Babylonians, the Greeks and Romans, they are of the nature of tribal or patron gods. One set of men follow Mammon and proclaim him to be all powerful, another has an equally strong faith only in aristocratic birth. They cry themselves hoarse, as did the Ephesians, "Great is Diana of Ephesus." These ideas, these ungraven images struggle with each other as did the gods of the ancients. They are immortal, and human beings have to fight and perish for them as did the Greeks and Trojans.

Unfortunately for the treatment of this subject the word Idea has in all ages been used in very many different senses. Sometimes it is used as an abstract summary of a class, as for instance the idea of a tree, a river, etc., sometimes it is used as an unattainable condition, as in the ideal man, the ideal of absolutely perfect mechanisms, or it is used to express the imaginary, the unreal. In this last sense the word is used by the Idealists. The coining of a new expression for an old friend is likely to mislead, and it is hoped that the word Idea as here used will not be misunderstood if it be steadfastly remembered that it is intended to convey the meaning of invention not only in physical but in intellectual matters.

A few inventions may here be enumerated; together they represent part of the life history of the human race. Language, whether in words or signs came with reason,

and though it was an invention in the same sense as writing was an invention, yet without words abstract thought could not have been possible, so that reason and language are practically twin sisters. This combination is called logic, and many people are so enamoured of it that their process of reasoning consists in the more or less natural flow of a stream of words of which they hope that it carries ideas. Such people are at best of course limited to the few ideas for which words have been coined, they cannot evolve new ones for which words have to be invented. Unquestionably this invention has and will continue to have the most powerful influence on the human race. Not only is language an invention, an idea, but it is practically the only medium in which ideas can live. It is the space as it were of their universe, just as time is the space in which music lives, and as length, breadth and depth is the space in which we live. This is as it should be. The substanceless words carry the substanceless and energyless ideas. The world of our idols is the world of words.

It would be instructive to dwell on the growth of language, for it represents in a small way the principle of Evolution and occupies in a sense an intermediary position between Evolution and musical development as exemplified in symphonies. Like weaving its own development is modified by natural powers, by the limitation of the combining abilities of the human brain, and by the limitations of the sound-producing powers of the various races, but only a few remarks can be made on the subject. Languages are constantly changing both as regard meanings of words and pronunciation. One musical theme grows out of another and all react on each other as do the different languages of different nations, but between Evolution and the growth of languages there is this difference, that whereas Evolution cannot reunite the species into which a parent stock is once split up, the different languages of one parent stock when forced to-

gether, amalgamate comparatively easily. Thus on the one hand the English language is a mixture of several branches of one Germanic stem, the Saxon, Norse, French and Renaissance Latin languages. These have reunited, but the equine tribe has split up into rhinoceros, tapir, ass and horse which can never be reunited. There is, however, a marked similarity between the development of music and languages, as illustrated by the persistence with which some sounds tend to change, for instance the K and G sounds. With some peoples they do not seem able to maintain themselves, and K rapidly degenerates into ch as in "Church" instead of "Kirk," into C as in "cell," and even into S and Z, while the guttural gh even deviates as far as the sound f in "enough." This tendency is stronger in some languages like Italian than in others like German, Dutch, etc. The latter have maintained the K sound of the Latin C and the a (ah) and e (ee) sound in Kaiser (Kah-ee-ser), Cæsar, and have even hardened the ancient H sound (probably Welsh Ll) into K as in Klotar and Clodwig (old German Hlothar and Hlodwig) which are our Lothair and Louis. Different races tend in different directions according to a law, which was first brought to light by the brothers Grimm, but not seriously investigated since then.

Returning to inventions it is seen that additional power was given to human beings with the invention of the first implements. Weapons and dwellings differentiated them very markedly from wild beasts whose best results in this line are instinctive, as in the case of the bee's hive and the bird's nest. Another invention which appears as an instinct amongst some animals is slave making. It represents the higher aim of that form of energy which concentrates into one little master brain the power of a multitude. The next invention is one which with one exception surpasses anything to be found in the world of instinct. Reason begins to show its superiority. This invention, if one may call it so, in the domestication of plants,

especially the insignificant grasses which developed into wheat, rye, barley, oats, etc. Then there must have come the invention of the millstone, and how marvellous is the enormous and persistent sway of both ideas. Cereals were possibly evolved more than 10,000 years ago, and it is only recently that some few men are again attempting to domesticate other grass seeds than those mentioned, but as yet without success. The potato has been discovered and perfected and America has evolved the maize plant. The millstone has also existed probably more than 10,000 years and it is only now, within the last decade, that it is being replaced by a new invention, the roller, which does the work of grinding more expeditiously and more efficiently and, so it is said, produces a flour which is harmful to the teeth. The Greeks created a goddess Ceres in honour of the one idea, but no one created a millstone cult. The preparation of food is too important and too realistic to be idealised or to be worshipped. Even the inventor of fire was not deified. Prometheus remained a man who at best had dared to associate with gods.

There are records in the dim distant past of Egypt and Babylonia, of inventions or ideas which persist to this day. The patriarchal, the tribal and the state idea must be very ancient. The inventor of stone hewing and brick making is unknown, but the dates when mortar and cement were first used have been determined. Agricultural implements, including the plough, are prehistoric inventions, so are the sword, the spear, the bow and arrow and the shield. Money, our modern idol, had also been invented more than seven thousand years ago, and in the temple of Juno Moneta the true principle was worshipped that wealth travels to those lands where justice and security reign supreme. Credit too has been anticipated in past ages, certainly in Babylonia, possibly also in Phœnicia, but it can never have been the power it is now. Individual credit has been one of the chief levers in raising trade and industry to their present pinnacle, and

national credit has made it possible to carry out wars on the present gigantic and costly scale. It is not at all pleasing that the chief effect of the wonderful invention of paper money should have been to give mankind a better chance than of yore to fly at each other's throats.

War too is an invention of ancient days, and the Greeks and others made a god of it. Wild beasts, even the most ferocious, do not war with each other; the wolf may devour the defenceless lamb and the lion may attack herds of cattle, but these are their food as they are ours. This sort of killing is done in a quiet way as it were, and is not called war. Individual animals of the same species also sometimes fight, generally out of sexual jealousy. Some men do the same. This is not war. War is carried on in obedience to some widespread idea, a patron god. The ideas which have been most active in starting wars are those of property. Invasion is a seizure of landed property, raiding is the capturing of living property. The ostensible causes of wars are, however, not infrequently of a different nature. The Persian invasion of Greece was dictated by the unalloyed idea of gain of property. Alexander's invasion of Persia was dictated by the idea of revenging the desecration of the Greek temples. Rome exemplified more than any other nation the combination of two powerful ideas, the gain of property and the rights of conquest or generally, the idea of a World Empire. This idea came into conflict with the Phœnician and Greek national idea of universal trade, which proved the weaker of the two. In later days Venice and Lombardy once more championed trade against the World Empire idea of Germany and Turkey. Once more the Goddess of Commerce proved the weaker. The traders of Holland and Portugal had better successes against Germany and Spain, but were outstripped by England, and the present century is likely to show whether the goddess of Commerce or of Imperialism is the stronger. The former always suffers under the disadvantages that her votaries

worship her in the hope of individual gains and not because of any national idea. Imperialism, on the other hand, rests for support on nations in which patriotism is treated as the highest, one might say the only duty and virtue of a citizen, and it is only too probable that the vicious idea of conquest, if held by millions, is likely to prove stronger than the milder idea of liberty of the individual. Once only did this idea take concrete form, but it was at once debauched into Imperialism. The French made a goddess of the idea of liberty, fraternity and equality and carried her triumphantly over Europe. But even before she had left the French borders she was already a myth. The Franks, a Germanic tribe, are Imperialists, not fraternisers.

Another cause of war is divergence of religious ideas, but this too is an artificial one, the real cause of religious wars being race divergence and race hatred. The Crusades were a struggle between the Germanic and Semitic races and between the commerce of Venice and the Imperialism of the Arabs. The Thirty Years' War was waged between the South and North races of Middle Europe, and during its latter days religion had almost disappeared at least from the armies, whose soldiers were recruited indifferently from amongst Catholics and Protestants.

It would be an interesting problem for modern historians, who are fond of investigating the growth of ideas, to trace the ups and downs of the various class interests of nations, for it was more often these interests than those of entire nations which have been at war with each other. In former generations slaves never counted for anything, but the trading classes of Athens, Phœnicia and Venice dictated their policies. Babylonian and Egyptian policies were doubtless influenced by agricultural interests. How is it that the manufacturing interests have nearly always played a subordinate part in the world's history? Even to-day when they are the essence of the life of such nations as England, Germany and America, the artisans count for

little more than the slaves of Greece and Rome. Only during the dark ages, when practically all other vestiges of civilisation had been swept away by the German hordes, did artisans rise to comparative importance, but only because they were forced to fight in defence of their homes. During the latter days of the Roman Empire it was the members of the artisan guilds of the towns of Europe who alone were able to withstand the savage onslaughts of the German barbarians. The Roman legions, even when backed by German mercenaries, melted away before these fierce warriors, and only the despairing artisans, encouraged by ever increasing successes, offered sufficient resistance to save what few traces have been left of ancient Roman civilisation. No wonder that the ancient guilds had a high standing, and many a knight was proud to be made a citizen of one of the republican cities, even if by doing so he gave up his aristocratic titles. Modern industrials are not of this breed. The populations which slept on the coalfields both of Great Britain and Germany had no courageous qualities. During the Franco-Prussian War very few Iron Crosses were distributed amongst the Rhenish Regiments, and Lancashire is the true home of the Quakers, who have adopted the convenient rule of not fighting but benefiting by the military exploits of others. The Lowlanders of Scotland stood in marked contrast to their warlike Highland neighbours.

Returning to inventions pure and simple, one finds that the weighing balance must have existed in Egypt even in prehistoric times, for the gold beads of individual bracelets of those remote dates are often of exactly the same weight. The balance as well as the length and volume measure were probably the inventions of traders, and were therefore almost naturally despised by logicians, but it was only when the balance was applied to the study of nature that real sciences came into existence. Chemistry was but alchemy until the balance revealed the secret of chemical combination, and only then was

Dalton's grand idea of atomic weights possible. See how powerful has been that single idea, which was not merely a patron god but a creative one. Without it chemical factories with their millions of capital would now have no existence. Again, more recently, a balance was applied to the weighing of energy effects, and Joule established the conservation of energy which Dr. Mohr had first suggested. It seems strange that these two far-reaching ideas should have emanated from an industrial town like Manchester, and from two amateur scientists, the one a schoolmaster by profession, the other a manufacturer.

Then again, mathematics can hardly be said to have been a science until the balancing sign (=) was invented and algebraical operations made possible. The Wheatstone bridge is an electric balance. In fact, every scientific device is more or less a balance, for it is now an essential in sciences to be able to compare like with like, and not only profess to do so as in the case of the Greeks who taught but did not apply the idea. They were too fond of wordy arguments and overlooked the ideas for which words are mere symbols.

The most ancient Babylonian and Egyptian inscriptions make no mention of the horse, the camel and the elephant, which with remarkable suddenness appear simultaneously as domesticated animals. Apparently the success of domesticating one of these animals, probably the horse, led to attempts at domesticating others. Long distance transport was now possible. This was proved at first no doubt by long distance trade across the deserts between Babylon and Egypt. Almost naturally, though it is sad to think that this should be the case, a new idea germinated and grew stronger and stronger, namely, that thoroughly effective war might now be carried on between the two highly civilised peoples inhabiting the fruitful valleys of the Euphrates and of the Nile, but separated by wide deserts. For hundreds of years after the first domestication of transport animals these struggles, of which the

Jews were the unfortunate spectators and sufferers, continued. War supported by transport animals now grew common all over the world. The Romans improved on the idea by making paved roads, and the Huns used the horse far more extensively than had ever been done before. Each man usually had two or three horses, and being armed with their spears and bows and arrows, they were more than a match for the Germans who still fought on foot.

In the meantime a new invention had been made. The Phœnicians and the Greeks constructed vessels which would carry both goods and men. Comparatively small fights occurred between them, though the Greeks were practically a nation of pirates, but the Romans, grasping the value of the invention for furthering their national idea of Imperialism, set about building fleets which enabled them to crush the Carthaginians. For centuries after that time, the means of locomotion remained almost stationary, they even retrograded, and it was not until a powerful impulse was given to navigation by the new ideas, for which Galileo suffered, that efforts were made to improve ships with which to circumnavigate the world. The compass was invented about this time as well as fore and aft sails with which sailors could beat to windward. Traders could now circumnavigate the world, and warriors could therefore do the same. The wars between Spain, Holland, Portugal, France and England now extended from the shores of Eastern America to the Indian Ocean. No sooner had England gained maritime supremacy than the invention of the steam engine for ships and road travelling gave a new vista to ambitious spirits. Napoleon had shown what could be done with the old means, and an indication has been given by the Russo-Japanese War as to what can be done with the new means. The possibilities are clearly apparent. World Empires in the true sense of the word are now possible. At present there are but two world powers, that of the Anglo-Saxons and that of the Slavs. The Goddess of Security, of Commerce and Industry

and the Goddess of Appropriation once more stand face to face. Will the Goddess of Trade deny herself the pleasure of a Quakerlike and non-military life of patriotic indifference and of social frivolity; or will England, America and the British Colonies, her present champions, disintegrate, like Phœnicia, Greece and Venice, and become a prey to the Goddess of Conquest? Time alone can tell. The struggle which is slowly but inevitably taking tangible shape will be carried out as it were under the patronage of the Goddess of steam and power locomotion. Much will depend upon whether Imperialism or Constitutionalism will be able to gain her full favour, whether the one or the other will be able to command both the most gifted and most enterprising inventors and organisers.

It is unnecessary to do more than mention a few additional far-reaching inventions or ideas. Watt's steam-engine removed the last excuse for employing slaves, and the new anti-slavery idea, like Charlemagne's religion, has been making converts by force of arms. Electricity discovered by the Greeks, and played with by scientists during the greater part of the last century, sprang into sudden life, like Minerva fully armed when Hjort, Wilde and Siemens invented a method of easily converting mechanical energy into electricity.

It may have been noticed that evolutionary changes though they may be long in preparation are comparatively rapid in taking effect. It is the same with inventions and ideas. Want, the mother of invention, is pregnant for a long time, but the birth is a short event. No recent examples are more striking than the many electric inventions, the dynamo, the telephone and wireless telegraphy. The same rapid springing into life is noticed with many great ideas which then receive the attribute "epoch-making." Amongst these, the Reformation and the French Revolution stand out most prominently, but nearly every political and religious change is sudden; sudden in comparison with the many ages which have led

up to them, a generation or two counting but as a moment in the history of the world.

The striving of Evolution is an unconscious one, but it has been shown that it is directed towards economy in the broadest sense of the word, towards maximum activity with a minimum of matter. Ideas being matterless, the spirit of economy, the essence of the highest forms of energy is necessarily absent, but is replaced by consciousness of objective. The French cry for liberty as well as scientists' search for a machine for producing electricity are as definite as the aims of Evolution are undefined. Nevertheless, ideas and Evolution have this in common, that they employ less highly specialised forms of energy as their servants. In fact ideas, or inventions, being energyless must employ the energy of mankind, but in addition the great ideas of the world, those which are perhaps only vaguely felt, employ other ideas as their servants.

This characteristic of ideas, together with their tendency to evolve one out of another, is the principle on which Ranke's and Draper's historical writings are based. Again and again Ranke points out that it was ideas, national tendencies which have determined the world's history, and in his eyes the monarchs, the reformers, were but the catalytic agents and therefore comparatively low grade manifestations of energy. The chief merits of these so called leaders are, that swimming with the flowing tide, they were generally the first to perceive any change of direction.

According to Draper, the ideas or inventions of to-day are but branches of ancient ones, so that there is nothing new under the sun. This is a view which a detailed study of history does not entirely corroborate. The complex world of ideas as it now is, has not grown out of a single one. There are several beginnings, in fact an infinite number. Children as they grow up evolve ideas which are absolutely new as far as they are concerned, as is

proved by their generally being quite wrong ones. Then again, if mankind feels any particular want, identical inventions are often made simultaneously. It is entirely wrong, for instance, to say that James Watt's steam engine grew out of Hero's ancient steam toy. If it grew out of anything it grew out of Torricelli's discovery of the force of vacuum. The possibility of utilising power had been demonstrated by wind and water mills, by slaves and domestic animals, and by gunpowder. It was, however, only slowly that the want of mechanical power was making itself more and more felt, but a want is not a sequence of events, it is the driving power, it is the warmth and moisture that lead to growth, but it is not the seed. Nor can seed grow if the soil has not been prepared. Steam power did not show its possibilities until after Watt. The blast furnace had not yet been invented for making the necessary cast iron, nor had spinning and weaving machines been invented for utilising the new power.

Draper was perhaps correct as regards philosophic and religious ideas. Powerful as they are above all others, their beginnings are not known, only the reformations are seen but these are generally quite as sudden as any evolutionary process. An old religion has become petrified into ceremonies and mysticism, its influence is extended perhaps by conquest over distant races whose natures are not in sympathy with it; suddenly the catalytic agent is introduced, the reformer appears and the reaction takes place. He spends a lifetime and often his life in evolving the reformed idea, possibly bloody wars follow, as they did under Mahomed and Luther, the new ideas, separated from the old, perfect themselves for a time and then they too get petrified like their predecessors and are buried like fossils in geological strata. On account of the impossibility of steering clear of controversial points, not even the briefest reference to the great religions of the world, the all pervading powerful ideas, will be

made, but as they present too many points of supreme interest to be passed over in total silence, a glance at the possible nature of their beginnings will here be taken.

Any savage understands full well that if he spears, or clubs or poisons an animal or a human being, it will die, or at least it will become ill. Few savages, even including those of North America can grasp the idea of senile decay and infectious diseases. They may well ask why should a healthy man or a healthy tribe suddenly become ill and die as they did in America by thousands when Europeans introduced the small pox. Why should a man die without apparent cause after having lived sixty, seventy or eighty years through all sorts of dangers. Why should the heart make two thousand million beats in a lifetime and then stop for good? Why does a man not live on for ever just as trees keep on growing which have been known to stand in certain positions for many past generations? A very plausible answer to these questions, one which would be carefully fostered by "medicine men," would be that illness and death are due to invisible wounds inflicted by invisible enemies and that these can only be defeated by secret means known alone to these charlatans. The truth that both are due to insanitary conditions and to senile decay must have revealed itself to occasional thinkers, but to proclaim such a doctrine in opposition to the medicine men would have meant death to him who preached it, and at best it would not have been understood, for languages in which the word illness does not occur, or where it means secret wounds, cannot express the idea of infection and contagion. And languages which have no word for peaceful death cannot express peaceful passing away.

However, when the true causes of death had been grasped by some ancient man and had been repeated over and over again, some trace of his meaning may have remained and will have been seized upon by reformers who wished to crush an existing system, and they will

have made it the foundation of a new superstructure as intricate perhaps as that which it replaced or with which it became interwoven. Sanitary admonitions exist to this day in all Semitic Religions and are even said to be the foundation of baptismal rights. The doctrine that death is a punishment for misdeeds, coupled with a faint idea that all things having a beginning must have an ending, which means that all things born must die, seems to have been expressed by the Jewish idea that death came into the world through sexual love, which after a time was looked upon as a sin requiring a scapegoat or saviour for atonement. In India the necessity for explaining pain and misery seems to have led to a similar theory. Both were looked upon at first perhaps as punishments for the misdeeds committed by parents and later when experience disproved this doctrine, undeserved sufferings were looked upon as being punishments for the misdeeds of some individual which had once been inhabited by the sufferer's soul. These two views about death are corner stones of practically all living religions.

Returning to the primitive savage, this time to the Australian bushmen, one finds that even to this day, one tribe, the Arunta, do not admit that births are the result of the sexual act, and the Tully River Blacks, while admitting this relation as regards animals, claim that the superiority of the human race is demonstrated by what they claim to be a fact, that the reproducing process of human beings is an asexual one. Why should savages believe differently? They have no domesticated animals whose breeding they can watch, and even if they have, nine months' gestation is too long for an average savage man or woman to recall to mind. The present Australian view was probably that of primitive man; however, after a time, as savages got civilised the truth revealed itself, but only to be at once raised to a mystery, and amongst people given to worshippings such a mystery would, of course, be raised to the level of something superhuman,

would become a religious cult. This accounts for the high esteem in which the male creative organ was held in all religious systems of old, and why the power of creating is even to-day a more important divine attribute than justice and mercy. When a knowledge of agriculture spread amongst these savages, and fruitfulness was looked up to as a blessing, it seems quite natural that this attribute should be worshipped in the goddesses Istar of the Babylonians, Sirima Devata and Kali of India, Diana of Ephesus and Venus of the Greeks and many others. Unfortunately these bountiful females have nowhere in towns remained what they were originally.

The true Venus was the goddess of agriculturists whose lives and prosperities depended on fruitfulness of plants, animals and human beings. Her fascinating usurper was the goddess of urban populations, who are not interested in the rearing of cattle, nor in the growing of corn, and to whom children are a burden.

The only religion which has discarded the mysteries both of birth and of death is that of Buddha. It is based on the scientific knowledge of his day that all life is of one and the same nature. He idealised life, and in a sense Buddha seems to have grasped the idea, which here has been several times hinted at, that life or energy strives to be freed from matter. His Nirvana is the Great Peace, a life free from matter but also without energy. Apparently Buddha did not teach that the forces of inanimate life were also life.

The worshipping of the creative organs, or perhaps a less worthy motive, will have suggested bodily decoration and thus dress will have been invented, not as a protection but as an ornament, for even in northern climates, especially in wooded countries, human beings have lived and have grown hardy in nakedness. The ancient Germans, the Britons, and the Red-Indians of America went naked into battle, but they ornamented themselves when

at home in their tents and villages. It is not at all unlikely that ornaments and dress were invented in warm climates. There the bright sun would show off ornaments and paintings to advantage. The former would probably at first consist of colourings, girdles and hair binders, probably garlands of flowers, leaves and trophies of the chase. Judging by old Hindoo carvings, which in themselves are proofs of a high state of civilisation, no dresses were worn in public even by Queens. Simple girdles will gradually have been elaborated into many chains which had then to be attached to skins for better support. Doubtless when weaving and dyeing with colours was invented, rapid strides will have been made, and girdles, loin cloths and primitive skirts will quickly have increased in beauty and size until they became the kilts and garments of modern days. This progress will, however, not have been an uninterrupted advance, for the more thoroughly people clothe themselves the more necessary is it for them to wash both their bodies and their garments, and the retention of the more primitive kilt by many races, especially in hot climates, indicates that the frequent washings which should be inseparable from the modern practice of wearing tightly fitting clothes, are evidently not universally appreciated. In fact, many medical men hold that although frequent skin washing is a decency when clothes are worn, it is not necessarily a health giving process. This view might be correct if modern clothes were not what they are, but seeing that the starch in a shirt front, which gets sour in time, is never entirely removed in the laundries but only gets added to, seeing that the so called hair linings of most coats are heavily sized fabrics, which also grow sour and are regular hot beds of microbes, seeing that the softness of the best kid gloves is attainable only by steeping animal skins in extracts of the excrements of dogs, and above all, seeing that the skin of the body of most Europeans is rarely exposed to the rays of the sun, which is

the most efficient microbe killer, it is obvious that bodily ablutions are necessities, not only for the sake of decency but also for the sake of health. Scantily and less artificially dressed people doubtless require fewer washings, particularly if, as is the custom in some countries, great attention is bestowed on the cleanliness of the garments. These conflicting views about dress are old and are traceable in most of the sanitary commandments of ancient religions.

Occasional views here expressed, while dealing with inventions and ideas, might appear to suggest that the highest aim of a man should be to create immortal ideas, and in practice at least Buddha was a disciple of this view, for the ideas which he created have outlived countless other ones, but the feeling that an invention is one's child is older than he. Creators of ideas feel and have always felt that they have done more than other mortals. They love and worship their substanceless children as a mother loves and worships her only child. Many a man has sacrificed his life for his idea, and endless even to-day are the bickerings between scientists as to who was the father of a new one. It would, however, be rash to say that the highest striving of energy is towards matterless ideas, which may be the Nirvana of Energy, but only Buddhists will feel inclined to assert that Nirvana is a worthy objective, a real goal.

These several chapters on matter and energy put into shade the little that could be said about the dualism of rhythm and melody in the musical world, and naturally so, for that world has only one dimension, whereas ours has also space with its three dimensions; length, breadth and depth, and the combinations which grow out of 70 chemical elements are almost innumerable compared with variations of rhythm, while the enormous number of specialisations of energy of which every one is a force of nature, causes even the total number of musical pieces

which have already been composed to sink into insignificance. The analogy between music and life is, however, not yet exhausted, and some very important ideas, which have perhaps suggested themselves while reading through these pages have still to be considered. The point of view will still have to be changed a few times more from the physical to the musical world and back again.

THE FOURTH DIMENSION.

The analogy which has been drawn between music and life has resulted in attaining new points of view both in the musical and in the material world from which both have been overlooked at will, and from which an insight into the principles of their structures has been gained. It has been shown that the world of music has but one dimension called time, and that it has two indestructibles called melody and rhythm, remove either and music as such has disappeared. Human beings can effect these removals but the melodies which strive with each other, which represent the people in the universe of music are powerless to remove from that world either time, rhythm or melody, and it is therefore only in this sense that melody and rhythm are indestructibles. From the point of vantage gained it has been possible to see not only that this world exists in time and space, but that it consists of two indestructibles, matter and energy. Life is not possible outside of time or space nor without matter, nor is there life where there is no energy. Human beings, which are highly specialised forms of energy, can change matter and energy, but they cannot annihilate either; therefore, as far as living beings are concerned, time, space, matter and energy are as indestructible to us as melody and rhythm are musically indestructible.

Having now carefully examined these indestructibles, an old question re-presents itself almost naturally. Is there a fourth dimension of space? Stepping aside into the world of music with its one dimension a similar question may be asked. Is there a second time? The most obvious rejoinder would be: "What does the question

mean?" To explain it musically though in human language, but not mathematically or algebraically, is clearly impossible. Listening to a symphony which is, of course, living its life in a single universe, the idea of there being two times seems absurd. Of course a symphony can be played faster or slower than the composer has arranged for, or the rhythm can be changed. Berlioz has even arranged music in which one half the band plays a faster time than the other, but in that case there are not really two times but only two different arrangements of one and the same time. These two times do not in any sense stand in the relation as do length and breadth which exist together in our world. As far, therefore, as one can judge, a second time dimension added to the world of music is an impossibility.

Seeing that human beings also live in time, the question may be asked whether two co-existing times are possible? The answer again is decidedly, No. Time may be reckoned by lunar months, as by the ancients, or by seasons or by years, or by both; that does not in any way make two times. If by a stretch of the imagination one time could be treated as if it were a length and the other as if it were a breadth, what would be the meaning of the product? Length multiplied by breadth is a surface, one yard or three feet wide and one yard long is one square yard or nine square feet, but what would be the meaning of one square hour or 3,600 square minutes? These are meaningless expressions, and therefore for this world as for the musical world it must be confessed that there is no such thing as two times or several times.

How does the matter stand with regard to the fourth dimension about which some mathematicians are so eloquent? From boyhood upwards they have been taught to mix up and confuse logic and mathematics until they cannot see that the two are absolutely independent of each other, and some mathematicians go so far as to assert that their science is merely the art of defining space, or of

expressing it in words and formulæ, and great pains are taken to find or to invent words which will represent mathematical terms or operations. This is very difficult even in solid geometry and is impossible when to our three dimensions a fourth, fifth, and more are added, and yet expert logicians when once they have given a name or a sign to a space with four dimensions seem to have no difficulty in interpreting mathematical formulæ with four dimensions to their own satisfaction, and could doubtless do the same for a six dimensioned space. But it is only necessary to mention that there would be two lengths, two breadths, two depths for everything, to show the impossibility of reasonable beings ever grasping a space of this constitution, for this idea is of course as absurd as that of two times. Our space is infinite, it is not surrounded by another space, nor does it contain another space, nor is it possible to conceive a something which is the square of a space. One knows the meaning of a yard and of a square and of a cubic yard, but to talk of square litres or gallons is to expose oneself to the danger of being thought a lunatic.

The idea of a universe with a fourth dimension, a second time and a second space may therefore be dismissed; it has no real existence except as mathematical expressions. But it should not be assumed that there is not a something analogous to our time and to our space of which our intellect has no conception. The members of the musical world live in time only, they cannot have the faintest conception as to what space is. In a musical sense there is no length, no breadth, no depth, no area or volume: five ideas without which the world would have no existence, but of which the musical world has not the faintest conception. We exist in time and space and living beings cannot grasp a world which has other somethings like these.

In spite, however, of the apparent absurdity of worlds having four dimensions or two times there are indications

in physical sciences that such worlds coexist with our own, but unfortunately the human senses are limited to perceptions of a single time, three dimensioned space, force or pressure and heat and cold, and as human thoughts cannot conceive other dimensions, words, quite naturally, do not express them, and without words it is very difficult to explain ideas which to many people must seem rather improbable ones. The attempt has, however, to be made.

It is known that matter and energy exist in a general way in time and in space. A certain quantity of matter, either solid, fluid or gaseous is seen to occupy a definite space which can be measured in terms of length, breadth and depth, and this engenders the idea of density of matter. Thus water has a density of one, which means that the weight of a unit of volume of water is unity. Iron has a density of about $7\frac{3}{4}$, which means that a litre or cubic decimeter of iron weighs $7\frac{3}{4}$ kilograms. Here then is tangible evidence that matter exists in space, for it can be divided by volume or distributed in it. Energy also can be shown to exist in space, for heat is energy and definite quantities of heat can be imparted to a definite volume of matter which then grows hot to the touch. In a sense, therefore, temperature is with regard to energy, what density is with regard to matter. Now the interesting point is that energy seems to be able to move in and out of some of its dimensions and even to forsake time altogether, and possibly matter can do the same. Take for instance, the case of a wire pendulum one meter long having a ball at its lower end which weighs one kilogram. If, either by means of a push or a blow, a certain amount of energy be imparted to the pendulum, the ball will move sideways, and being suspended, it will also rise until the work done in lifting the ball is exactly equal to the energy imparted to the system by the push or blow. The ball has come to rest, say, one-tenth meter above its lowest position and therefore it is clear that one-tenth kilogram-meter of energy has been expended, for this is the mathematical

method of expressing energy. By means of a catch the ball can now be held in the attained position for untold ages which means that the imparted energy exists outside of time. In this form energy is called static or potential energy. If the catch be withdrawn the ball descends, and while the ball is swinging past the lowest point of its path all the static energy has been converted into dynamic energy and it now exists in time, for this form of energy is expressed as being the product of the mass or inertia of the ball and the square of its velocity. The swinging pendulum is therefore a simple illustration of energy moving in and out of the world of time. But that is not all. When the ball has once been arrested it can be moved north, south, east or west, and all round the earth without changing the static energy provided that its height above the lowest or original position is not altered. Static energy may therefore be said to exist not in space but in line-land. It exists in only one dimension, in height.

Electricity presents other examples of indestructible energy being moved in and out of worlds which have dimensions to which physicists have attached words, but about which human beings know nothing, because none of their senses are able to perceive electricity. All that animal nerves can do is to detect violent changes of electric condition, but that is a sense of a very low order not deserving the name of a sense. What would be thought of the sense of touch which was capable of feeling change of pressure but not pressure itself, which was capable of feeling change of temperature but not heat and cold, etc.? Beings possessed of such a deficient sense would feel the first pressure of a knife edge but not the continued pressure while cutting, they would be aware if placed in slowly heated water that a gradual increase of temperature was taking place, but this feeling would not change even if the water finally got so hot as to scald them to death. Living beings would not be what they are if

their senses merely indicated changes, and yet with regard to electricity that is all that our nerves do for us, while magnetism as well as its changes are powers which are quite beyond them. One may approach close to the most powerful dynamo, or place oneself in the centre of a region which is so strongly magnetised that iron implements would be wrenched away, as by an invisible force, and yet not one of the five senses with which human beings are endowed would give the faintest indication that the magnetic lines of force are intersecting the individual in all directions. Although the experiment has not been tried there can be no doubt but that if a short rod of iron or steel were swallowed and if the individual were then turned round while standing between the two poles of a powerful electro-magnet, then the steel or iron bar would maintain its direction and would cause the intestines to get entangled and yet the individual would be unconscious of the magnetism.

It is equally well known that a person standing on a sheet of glass or other isolating material can gradually and without feeling the operation be charged with so much electricity that it would spark through the glass plate. The only sensation during charging, a purely mechanical one, is that all hairs tend to stand out. Again it is possible to pass a current of electricity of such intensity through the human body that it would suffice to light up a house, and yet, if this current be turned on sufficiently slowly the individual would feel only chemical changes, but no electricity as such. Woe to him, however, if he were suddenly to let go the terminals, the almost instantaneous change from full current to none would kill him as certainly as the sudden turning on of the current.

Endowed with nerves, which as regards electricity and magnetism, and almost certainly as regards chemical and organic forces, are utterly unresponsive, it is not to be wondered at that, although physicists have invented terms, such

as Volts, Ohms, Ampères, Watts, Coulombs, Farads, etc., and although their relations to each other are clearly defined, no one, not even the most learned scientist, can have the faintest conception of the nature of these things. If human beings had an electric sense they would know, or would think that they knew, just as they think that they know what force and pressure are, but being without an electric sense the true nature of electricity seems unknowable.

Nevertheless if a comparison be made of these various expressions, relations seem to manifest themselves similar to the relation of time, space and matter to energy. In other words, Volts, Ohms, etc., are of the nature of dimensions, but dimensions of a world or of several worlds which human senses and intellects cannot conceive. Thus energy can be divided by or spread over time and is then called horse power by engineers and Watts by electricians. If a Watt be divided by or spread over the square of a Volt, a something which may be of the nature of a surface in the supposed electric world, then the result is electric conductivity, a something which is as incomprehensible to human beings as are the meanings of Watts and Volts. If, however, there be an electric world with living individuals they would understand what was meant, but if their world were outside of space they would be thoroughly puzzled by the assertion, which is self evident to us, that the result of dividing energy by pressure is the cube of length.

The previous example of the pendulum in which energy moves in and out of time can also be illustrated by many examples in electricity of which the following is perhaps the most striking. Let there be two brass balls perfectly isolated from each other and let these balls be charged with positive and negative electricity, then, as is well known, the electricity will exist only over the surface of these balls, and live as it were in Flatland, for it occupies no volume. With perfect isolation this condition can

persist for untold ages, which means that like static energy, electric potential does not exist in the world of time, it exists only in a surface world. If now, however, the two balls were to be connected by means of a wire, the wire which occupies space will be filled with electricity and because there is a flow and a velocity, this electricity suddenly exists in time. Each time that the experiment is repeated, energy in the form of electricity moves in and out of time and space-land into mere surface-land and then back again into time-land and space-land.

These few examples must suffice. They do not prove that electric units are dimensions of spaces which to us are incomprehensible, nor do they prove that energy moves in and out of these several spaces or universes, but the subject is deserving of considerable attention, for it seems to be the only direction in which researches into worlds having dimensions different from time and space seem to be possible. Perhaps, too, it may ultimately prove convenient to mathematicians to deal with the forces of nature as if they acted in worlds in some of which time, space, and other dimensions co-existed, while occasionally these disappeared and others took their place. Under such assumptions it would not appear so absurd as it does now to deal with time squared, velocity squared, electric potential squared, dimensions which are of the nature of surfaces in the time world, in the velocity world and in the electricity world.

In the world of music there is at least one similar incomprehensibility, but only from the point of view of an inhabitant of that world, whereas to us the thing is so natural that it may perhaps not be easy to grasp the difficulty. It should be remembered that the philosophical melodies or the inhabitants of the musical world cannot be expected to grasp the idea of strength or intensity of sound. Even if their perception of each other is by soundless vibrations, just as oscillating stars and oscillating pianoforte strings perturb each other, they are

still unable to grasp the idea of greater or less amplitude, for that requires a knowledge of space. Yet no matter how the musical melodies react on each other, they feel rhythm or will be influenced by it, which means that they will feel that certain notes are more intense than others, and they will doubtless be influencing each other or show that they have been affected by changes of loudness from *piano* and *pianissimo* or to *forte* and *fortissimo*. It may be possible for a philosophically disposed melody to discover that, for instance, the first note of a bar is usually the most intense, and possibly, too, it will puzzle over the fact that music moves in jerks and sometimes contains pauses. The philosophically disposed melody can at best arrive at the explanation which has here been suggested in the case of energy, that a something which results in musical notes being sounded, seems to enter in and out of the musical world. The musical philosopher may perhaps be able to deliver a lecture in his own musical language showing what the law of rhythm is, *i.e.*, a change of amplitude, but he will be dealing with things which are as intangible to him as an Ohm or Ampère to our physicists. The disappearance of vibrations during pauses which are part and parcel of the musical piece, will be as incomprehensible to the philosophical melody, as to us, for instance, is the disappearance of an enormous amount of energy when water is separated into hydrogen and oxygen. To all intents and purposes that energy has transferred itself temporarily into a world which has dimensions to which chemists have not even given names. For the time being it has disappeared as completely as vibrations have disappeared out of the musical world during a pause, and the mere fact that an indestructible something like energy can apparently disappear out of our world, is a strong argument in favour of the assumption that it is hiding in other worlds which to our intellect are unknowable, but if we use Kant's equivalent expression, transcendental, they would appear to belong to the same

category as time and space. These suggestions, if expanded may possibly lead to the conclusion that only Energy has a Real Existence, whatever that may mean in a superknowable sense, and that time, space, pressure, matter, temperature, enthropy, electrical potential, and resistance are merely its factors, just as white light can be split up into all sorts of shades of colours, and any number can be split up into its factors : for instance, 30 into 5 and 6, 3 and 10, 2 and 15, into fractions, roots, irrational and even imaginary values, to some of which, strange to say, the name transcendental has also been given.

There is a further peculiarity about the nature of energy, which may be unimportant as regards the subject in hand, but which seems to have a bearing on the nature of matter in general. It is true that energy cannot be located but it is clearly always associated not with a single material object but with two. Thus potential energy is represented by the attraction which two masses exert on each other; kinetic energy is represented by the velocity of one body in relation to another, and atomic or chemical energy by the forces between two or more atoms. Thus, although life may appear as the dualism : matter and energy, energy itself also seems to be a dualism, or else it grows out of a dualism which may exist in matter.

THE CREATOR AND HIS WORK.

HAVING shown that worlds could exist which have, what for want of a name may be called superior dimensions, the questions should now be put, "Can the melodies of a musical piece grasp the idea of their composer?" and its counterpart, "Can man grasp the idea of a Creator?" To deal with the second question seems a formidable task, but it is much simplified by the plan here adopted of first assigning to human beings the same subordinate position to a creator which musical melodies occupy in relation to their composer, and then by remembering that a creator may live in a world whose constitution is quite incomprehensible to reasoning beings, an enquiry into the world's relation to its Creator can, without a suspicion of irreverence, be freely indulged in; for with the help of the musical analogy certain conclusions can be applied to the more serious subject of the world's creation.

This world and the musical world have each a pair of indestructibles, matter and energy, rhythm and melody. The laws of music and the laws of life have also been compared and their working traced in the development of a musical piece and in the development of life as represented by several manifestations of energy. Mention has been made of the musical composer and now the question arises, "What is the relationship between him and his musical productions?" or as he is fond of calling them, "his creations." In reply to a question he will however admit that he did not make the *laws* of music, which have been detailed in a previous chapter, and which are part and parcel of the world of music. He may perhaps

admit that he has occasionally broken these laws, he may have ignored the prohibition against successive fifths and may feel sure that he could not have attained the effect at which he aimed in any other way than by taking liberties, but he will, whether he likes it or not, have to admit that the laws of music limit his creative powers. He cannot therefore claim to be the true creator in the sense that our Creator is supposed to have power to enact the laws of gravity, heat, electricity, chemistry, and evolution. The composer will, according to published note-books, admit that he has had many musical failures, occasionally he may have hit on a promising "motive," but expand it as he might, in a hundred different ways, he always found himself checkmated. The "motive" had in itself, as one would say, the germs of death, it led to discords which could not be resolved, it led to noises, not to music; or it tended towards Nirvana the Great Peace, which to lovers of music is a mere harmonious moan. The composer may explain that in such cases he has had to take the bull by the horns, to break off the melody which would not evolve, to create a pause or a pandemonium and start afresh, but, if as should be, a development of the original "motive" make its appearance, the composer is once more confronted with the same difficulty.

Evidently the composer will have to admit that there are forces in the musical world which he cannot control, that perhaps it is more true to say that melodies merely appear to him, that he feels them growing in himself, he captures them and lays them before the world. He is Prometheus who snatched down fire from heaven for the benefit of mankind, and who had to suffer for his sacrilege. He may admit even more; he may say that the musical genius lives not only in this material world and battles with its forces, but he also lives in the world of music and of harmony. It is due to his dexterity, that melodies are transplanted out of that world into this, he is therefore not a creator but a benefactor, and like most benefactors,

a martyr, for living one life as he does in a world of harmony, his real life with its bitter experiences is to him a purgatory. This, perhaps, explains why musical composers as a rule are more irritable than other human beings.

Turning from the composer and asking the symphony and its various "motives," which as assumed are the individuals in the world of music, what they have to say on this matter, who created them, and what is their idea of a composer? their answer would probably be: "We were not created, we grew. In a certain sense we have always been and always shall be, we develop, we evolve, we change." They may say that most musical "motives" lead a perpetual life by endless repetitions, and that one part of their lives is what we call memory. Melodies can no more obliterate the past memory out of which they have grown than human beings can annul the influence of an ancestor in their family. A time comes when a past melody produces its effect, and then a development into something else takes place, sometimes rapidly, sometimes slowly. Melodies will say that they develop and are not created, that human beings may faintly grasp this growth when listening to some of the best symphonies, but that most musical pieces (mark the word pieces) are not music but mere patchwork. They do not recognise themselves in our musical pieces. They in their own world live their own life, a life of endless harmony. When taken into the physical world they are disorganised, half a dozen melodies find themselves forced into contact, with more or less gentleness, but forced all the same against their nature, and the composer, who thinks he has created them has done no more than use them as labels for his characters or for his ideas.

One could not argue with such musical "motives." Turning therefore to a set of more philosophical melodies or "motives" which either do not feel injured as do the last, or which perhaps have been handled by the composer more

in accordance with life in the musical universe, these may perhaps be understood to admit the possibility of a creator, but as for explaining in their own language, *i.e.*, in melodies, what a composer is, what the paper looks like on which he wrote, or even the instruments which sounded them, is an absolute impossibility. Melodies cannot speak of space, there is no matter in music, no pen and ink, no flesh and blood, no nerves, no ear, only time and a something like memory. The philosophically disposed musical "motive" may perhaps harp back to what it knew of its own beginning, and what it feels of its coming end. Its beginning was a silence. Silence in its opinion might be its creator, all powerful Silence. Another philosophic "motive" might say that Silence did not create us, for silence is death, we have grown out of a primal cause, out of the first note sounded and searching back far enough it ought to be found. Such a melody perhaps overlooks the fact that the first note is merely the one which recurs most frequently in his musical life. Another philosophic 'motive' may perhaps say that the primal cause is musical memory.

In the physical world the materialist says that there is no creator, only a prime cause but what that prime cause is cannot be known. Some affirm it to Motion, and as motion is only possible in time and space, the materialists still have to explain who made these. At any rate, they have as yet merely given a new word for Creator not an explanation of what He is.

The Buddhists, although classed as atheists, admit the possible existence of a Creator, but not of patron gods. They take the same view of Him as musical motives may be assumed to take of a composer. They cannot grasp His constitution, or functions, and they assert that He either cannot interfere with the laws of nature, or that having established them, He will not spoil His own work, which means, that as far as this world is concerned, He is not or does not wish to appear almighty. For this

reason Buddhists are prohibited from praying (though their women do so) because it is considered presumptuous on the part of an individual to imagine that a Creator would alter his own laws of nature because of a verbal supplication; or, if he has not made these laws, how can he alter them?

The Brahmin and the ancient polytheists make a distinction. They have patron gods, to whom prayers are offered and who are believed to have power over forces of nature and over events, and also one or more creators whose powers, however, seem limited. This one distinction between patron gods and creators is an important one. Clearly that which concerned primitive people most was their own happiness, the power of their tribal god was also their power. He could give or withhold victories, riches, and happiness, he was therefore prayed to and worshipped, which signifies that those acts had to be indulged in which pleased him. Who created the world and how this was done were obviously questions of minor importance, matters to be settled by philosophers. The practical man wanted to be happy, and did not care who made him and the rest of the world, but he prayed to his people's patron to give him a happy life.

In early days the wonders of nature and its harmony were not known to the people, or but faintly. The indestructibility of matter and energy, a discovery of more recent times, was not recognised and the impossibility of creating something out of nothing did not appeal to them as it appeals to us. The ancients could therefore, without difficulty, believe either in a single creator, or in a factory of creators, but generally the matter was treated as being of but slight importance.

The Babylonians had invented a history of the Creation but it is not clear that it was treated as an article of faith. However when, even before the Babylonian captivity, the descendants of Judah had first looked on their tribal patron God as being one jealous God amongst several

others, their tendency was to look on Him as being the only God, and therefore, also, the Creator, and the two preserved stories of the creation by Jehovah and Elohim grew to be of prime importance. The early Christians seem to have held similar views, and adopted them as articles of their faith. Modern Jews, Christians, and Mohammedans believe not only in a Creator of the Universe and of the forces of nature but, endow Him in addition with the qualities of a Patron who is both capable, and at times willing, to interfere with these forces which he is supposed to have created and to effect miracles for a single person's benefit. Of these the most highly cherished is resurrection after death.

The modern materialist believes in a world which was started by a prime cause of events whose endless sequence has no beginning. Leaning on this absurdity it is not for him to scoff at the idealistic but certainly more logical religionists who look on the world as having been designed.

Here, then, is a brief summary of the views of human beings about a Creator. They sound uncommonly like those which were laid into the mouths of melodies when asked to express their views about the nature of a composer, and seeing that composers are realities, this analogy may serve as a guide in leading towards the belief that a Creator of the Universe exists but that He is neither of this world nor of this time; at any rate, the three great Religious Divisions agree in believing in His existence. "A thousand years are to Him as a day and a day as a thousand years," probably means that His existence is not in time, just as the body and intellect of a composer has no existence in musical time. The Creator's world may embrace this one as it in turn seems to embrace the world of music, but His world may have other dimensions besides our length, breadth, and depth, and other indestructibles besides matter and energy.

If these views be accepted, there is still the question,

arising out of the musical analogy, as to whether the relation of a Creator to this world is of the same nature as that of a musical composer to his work, over which he has but a partial control, or whether a Creator is absolute in His power? Has He created time out of no time? Has He created space out of no space? Has He created matter out of no matter? Has He created energy and has He ordained that energy shall not exist out of matter? Is energy perhaps Milton's fallen angel chained to inert matter and caged in space? If that be so, then, of course this Universe is the hell from which life energy naturally wishes to flee.

These are thoughts which cannot be resolved and have to be dismissed with a feeling of disappointment, for if, while admitting the existence of a Creator, one imagines Him to live in an altogether different world, how can one hope to learn from Him what should be the aim in life. Yet energy, which in its lower manifestations, strives blindly, has been so highly specialised in the human race that it has a consciousness and that it can strive after definite objectives. Why should this consciousness have come into existence without a knowledge as to what are good aims? These again are questions which cannot be answered, and yet in one form or other, they are universally asked and they betoken a striving which may be said to be one step above the one which was so conspicuous in Evolution. In that manifestation of energy, the desire to be free from matter appeared as a tendency to economise matter; the longing which reasoned beings seem to have is to grasp the real aim of energy, and looking on this as perfection, to strive after it with all their might.

PERFECT MUSIC.

In the chapter on Music, the question has several times been asked: "What is true or real music?" it being there assumed that true music stands in relation to musical pieces as real life stands in relation to theatrical plays. Now, even with stage plays like "Othello" and the "Merchant of Venice," which give the impression of being true pictures of life, it is felt that the one portrays a better or more perfect life than the other, and in real life innumerable examples could be adduced of what seems to to be imperfect life and a fewer number of what look like perfect life. A similar distinction may be possible in the musical world, but seeing that even in the physical world of ours the subject must bristle with difficulties, it is almost impertinent to attempt to decide what in the world of music would be classed as the most perfect melodies. But the attempt has to be made, and the question has to be examined as if one were an inhabitant of that world, though in reality one is connected with it merely by the solitary tie of being able to hear vibrations. In spite of this disadvantage the assumption may be made that the reactions of melodies on each other, resulting in their evolution, are felt by them as forcibly as by us, the chief difference being that they are unconscious of the influences but submit to them, whereas human beings have acquired consciousness and can analyse causes and effects.

Now, in trying to discover what is perfect music one has to guard against allowing one's own taste or class or national conventions to act as a guide. Further, one has to try and dissociate music from the instruments which

produce it. Wood and wind instruments suit one set of surroundings, brass instruments suit another, and the human voice is affected not only by locality, but also by the meanings of words. Surrounding influences should also be discarded. Perfect music should not be affected by transplantation from indoors to out of doors, from Church to Concert Hall. Lastly, the moods of the players and listeners should not be allowed to influence the judgment, for to those who are either sad or joyful, music appeals in different ways.

If now with all these precautions the question be asked, "What is perfect Music?" the first answer is a negation. That which is not music cannot be perfect music, therefore continuous silence, everlasting musical death, cannot be perfect music. Then also, noises being superlative, discords cannot be classed amongst perfect musical beings. Similarly any music which is diseased, having in it the germs of destruction which will ultimately lead to absolute silence or death, or to irresolvable discords and confusing noises, must be imperfect music. Thus far the ground seems safe, but it is doubtful whether it is permissible to go so far as to say that any music leading to silence or a discord, even if resolvable, should be classed amongst the imperfect. If that should be so then some of the melodies which appeal to us human beings as the most beautiful, the grandest, would in the musical world have to be classed low down. Then too if discords and changes of keys should be called imperfections, perfect music would be horribly monotonous, at least to us.

Any music written in a scale whose notes do not stand in the relation of the whole numbers one to six or their multiples or fractions is not pleasing and is not music. The introduction of ratios of vibrations such as two, three, four, five or six-sevenths, would strike human ears as being utterly unmusical, but can it be asserted that this is the feeling in the musical world? Judging by the complexity and the number of the vibrations of light, it

is not safe to say that the limit of ratios made up of the primes from one to five and their multiples must not be passed. Light being beautiful though complex, why should perfect music be unutterably simple in comparison?

Under these conflicting possibilities it is doubtless safest to take the middle path and to fix on that music which human beings like best as being the best, of course, only under the already mentioned precautions. But, while pursuing that path the fact should not be blinked that this is arguing in a circle, for, as it is intended to apply deductions from the musical world to real life, there is always the danger that certain musical conditions have been adopted because they harmonise with those existing in this world, and their re-appearance when treating the larger questions is but natural. But this process has the advantage that we should see ourselves as in a mirror in which right and left appear reversed, and therefore unusual, or as in two mirrors which let us see the side face and back as others see these.

Those who dislike music, or who can at best only criticise it, can have no say in this matter. Amongst those who like music a little there are doubtless many who soon long for endings, and even the most ardent lovers feel some relief when at last the final chords of some great oratorio come to the fore. Let it be assumed that endings are introduced artificially, and that the music in question has no ending. Then that part which is being listened to is the part by which the whole should be judged. No one would like it if it were a monotonous canon which could not end if it would. It would be decidedly tame if it were restricted to one key, and if uniform time of uniform volume without climax, without relief and without pause were adopted. Lovers of music admire that music which shows what music really is. They wish to see it in the fulness of its life. A composer will point to certain pieces which glorify his art as being those he loves best. Although he is but an intermediary, he

thinks himself a creator, and selects those melodies which agree with his temperament. Some compose wild music, others majestic swells, others again like it full of changes and varying moods; but all, unless they have set themselves the task of writing to words or sentiments, will admit that a musical piece is the more perfect the more naturally it grows and the more vitality it shows; and, within the limits of their own temperaments or perhaps capabilities, it has to show itself in all the moods into which it is capable of transporting itself, timid and bold, languid and energetic, silent (even pauses are but suspended music) and overbearingly loud. In all these changes the composer feels the reflection of his own efforts, and, above all, few things give him greater pleasure than the production of great effects with simple means.

Briefly stated, music seems the more perfect the more healthy and vigorous it is, without being boisterous and, perhaps, full of discords, and without being monotonously dull, due to the presence of germs of death leading to premature silence. Although perhaps music may now and then sound like a sigh of pain, this is but one of its moods; the change which follows only reveals the existence of a power to vary. In other words, perfect music should be full of musical life.

PERFECT LIFE AND HUMAN HAPPINESS.

Returning from an imaginary interview with musical composers to this physical world, and wishing to obtain a definition of perfect life, the difficulty is encountered of not finding the counterpart to a composer, or assuming, as may well be done, that the Creator could give the desired information, there are no tangible methods of communicating with Him. Religiously-inclined people will at once insist on the value of inspirations, but these are far too varied to be trusted, and from a scientific point of view they are affected by methodical errors which are not easily eliminated. Thus it is found that the religious inspirations of warrior tribes have always been of a warlike nature, whereas peace-loving people pin their faith to those inspirations which speak of harmony and goodwill. No people have been more frequently inspired than the Jews, in fact, for centuries their state system seems to have been based on prophetic inspirations; yet a cursory glance into the books of Kings and Chronicles suggests, even as regards daily political events, that there were generally a hundred so-called false prophets to one so-called true one, who had no distinguishing mark about him, and only after death was he singled out from amongst the rest because his sayings had come true. His sayings must evidently have been very distasteful to his contemporaries; but if, as may well have been the case, his inspirations were real ones, this only emphasises the difficulty of the situation; he being human could not fully grasp what may have been divine promptings and the few words of the language of which he had command did not give full expression even to the small portion of divine

truth which he did grasp, while the kings and people whom he addressed were unacquainted with the train of thoughts which alone could help to an understanding of the rendering of his inspirations.

Assuming, however, that inspirations out of which the various religions have been built up, are worthy of being considered important factors with regard to the question of perfect life, then as they differ from each other in many respects, it is advisable from a scientific point of view to discard the conflicting results and to search for the one principle which is common to all systems. This principle may be stated as being, that the various peoples of the earth are influenced by those inspirations which tell them to live the lives which suit them best. The peace loving Burmese accept Buddha's teaching to look on all life as one great whole; the Hindoos, like many of the ancient nations, accept the inspirations about the realities of a series of gods which, as far as can be judged, represent the numerous human passions and weaknesses. The majority of the Semitic races, because they are naturally warlike, accept as being inspirations that portion of the Old Testament which is embodied in the Koran and many Europeans, whose natural tendency is to act only in the directions in which they are forced or guided by rules and regulations rather than by reason, incline to other portions of the Old Testament. The spiritually related Chinese almost naturally accept as inspirations 300 laws and 3,000 Rules of social life which Confucius gave them. They may be said never to reason. Some Christians rely only on the severe and ascetic inspirations of St. Paul, others prefer to look on the joyous life of Christ as a guide.

On account of the nearness to us of the Christian religion, it is perhaps advisable not to deal with it, but to refer to the somewhat analogous one of Buddha. He had arrived at a similar conclusion to that contained in these pages. To him all animal life was one great whole, and to

destroy life was to destroy part of a whole. In these pages the conclusion arrived at is that, all animal life, all vegetable life, and all physical life are merely different forms of energy, the life of the universe, therefore. . . . . No, there is no therefore. To say that because all water is of the same nature does not lead to the conclusion that it must not be allowed to run down a hill, nor that it must not be evaporated to form clouds and rain, nor that it must not be drunk, nor that it must not be split up chemically and utilised in the building up of living cells. From the point of view here adopted, Buddha's inspiration, that it was sinful to destroy any life is not strictly justified. It is based on an arbitrary dogma that like should not destroy like. Two thousand five hundred years have passed since he spoke, but even though much has of late been revealed to the human understanding, we are not yet justified in laying down any rule about life; all that can be done by reasoning beings is to try and ascertain what is the nature of energy or life, and when, at some future date, a satisfactory answer will have been found, it may perhaps then be possible to say definitely what its strivings are, and how, by living in accordance with those strivings, a perfect life may be attained.

This conclusion, it must be admitted, is a most unsatisfactory one, for although many of the apparent strivings of energy have already been mentioned, and though Evolution has been pointed at as indicating the nature of these strivings; yet these are mere indications. Some, if taken alone, are opposed to modern views, but in harmony with ancient ones; others are in harmony with modern ones. Who can judge which are correct? For instance, the frequent indications that an economic or saving tendency is in harmony with the strivings of energy seem all right, but then Alexander, Cæsar and Napoleon would agree with the other great principle of Evolution that the sacrificing of millions of lives in the carrying out of a great idea or

improvement is justifiable; and, again, the members of the Society of Friends and all Buddhists would doubtless give more importance to dying natural deaths than to carrying out great ideas. The engineering profession utilises not only the lowly manifestations of energy for the benefit of mankind, but it also utilises the skill, based on the nerve energy, which can be imparted to a mechanic or a navvy. Formerly the same principle was more fully exploited, and superior races of mankind made slaves of the more lowly ones. Nowadays this practice is not considered right. For these various reasons it appears that it is as yet too early to decide what is perfect life, but something may be done by enquiring amongst the various conditions of human life, not exactly what is perfect life, but what is true happiness.

The innumerable religions and philosophic systems of the world testify that the secret of human happiness is not easy to solve, for even in such a small and so highly gifted a community as that of the Greek cities two opposing views existed, that of the epicures and that of the stoics. In their early days they did not differ markedly from each other, for the one taught that men should avail themselves of their reason and plan to live as pleasant a life as possible, and the other also taught men to avail themselves of their reason but to avoid unpleasantness, or to bear the inevitable with fortitude. These two views rapidly degenerated—the one encouraged luxury and the other asceticism, and yet the disciples of neither could claim to be happy. Diogenes, who represented the one extreme, and who had reduced his condition below that of a filthy beast, was irritated by such a trifle as Alexander's shadow. Alexander, the possessor of vast empires and all their riches and pleasures, sighed that he had no more worlds to conquer.

There is another school which, although it goes by no particular name, may be best associated with Machiavelli. It teaches that the objective of humanity should be the

average happiness of "the state," or, in more popular language, the average happiness of the greatest number. Deal with this teaching in whatever manner one likes, it leads to but one result, viz., "it is better that one man should be crucified than that all should perish;" a theory which is sublime in the mouth of the martyr, but which is fiendish when roared by the multitude, no matter whether the cry be directed against an individual or against a class. The Communists would shoot the rich to distribute their wealth amongst their own little group; Adam Smith and the Trades Unions teach that a labourer shall be crippled by having but one trade so as to enrich the employer, and Cobden taught that the farmer might go begging in order that his class, the industrial, might grow rich on cheap labour. Theories which justify such atrocities cannot teach mankind what perfect life should be.

These few broad examples are somewhat discouraging, but a detailed enquiry may lead to more definite results. Who are the unhappy ones? Are they not those who suffer punishment, those who have been forcibly deprived of liberty, or who have been crippled in their liberty of action by being punished, and, above all, those who are expecting to be deprived of their lives? Such people must be unhappy. Even the hero, as, for instance, Nelson, would have been happier in the hour of victory could he have lived on. This is in agreement with the musical analogy, according to which one of the first conditions of perfect life, and therefore of happiness, must be life, and also the liberty to live. Unquestionably there are persons who feel more happy in prison than out of it, and where this is not due to a contented spirit, which makes the best of everything, it must be due to a vague feeling that to be perfect, the life of a conscious being must have an objective which unfortunately is missing in most men who have not the power of self control, and who have no force of character. Thus some confirmed drunkards deliberately

go into inebriates' homes, and others curtail their liberty of action by making vows of abstinence. Certain classes of lunatics adopt the same course, for when they feel themselves growing morally weaker and weaker, and know that the time will soon come when they cannot control themselves, they voluntarily return to the asylums in which they have previously been placed by force. Some even commit crimes with the avowed object of being incarcerated.

Death, too, has no terrors for some. In cases of suicide death has grown to be the objective, in other cases death has been looked upon as a means to an end. A person who is out of harmony with the world, who struggles with adversity or whose aims and undertaking are constantly crushed, may come to the conclusion, like Hamlet, that the restrictions of life are unbearable, and this feeling is likely to be all the more powerful the more firmly the individual believes in a happy hereafter. With a view no doubt of checking this tendency which their own teachings have encouraged, some religions have damned suicide, but neither the Ancients of Europe nor the modern Japanese look on self-slaughter as a sin. A soldier's or a martyr's death is a glorious one, for their objectives are thereby furthered much more perhaps than if they had lived on.

The next class of unhappy beings are those who suffer from illness and bodily defects. Their liberty to live a full life is to a certain extent curtailed. It will, however, be found that those who suffer from earliest childhood are as a rule less unhappy than those to whom illness and accidents come in later life. The former have brought themselves into harmony with their surroundings by adopting suitable objectives. There have been artists without arms and hands who painted with their feet, etc. Others, however, who have fixed on objectives during the period of their full vigour, find it difficult and even impossible to change when illness or defects of old age

overtake them. Nothing is perhaps more pathetic than a composer growing deaf, an executant getting paralysed and an artist losing his sight. A less noble, but actually a more painful case, is the dyspeptic gourmet, whose one and only object, good living, is now a torture, and who naturally makes himself a constant misery to his circle.

It thus appears that one cause of unhappiness is restricted liberty, which confirms the view that human life, the highest manifestation of energy, is a tendency having a conscious objective. If the surrounding lower manifestations of energy are too powerful for the individual, or if his aims are too high and cannot be carried through, then that life is not perfect, it is marred. That life is an unhappy one. One of the conditions of perfect life, therefore, seems to be that the more lowly manifestations of energy should be made subservient to the higher ones.

Those who in their own estimation lead perfect lives, the "uncommon good," should be happy, and they say that they are. They preach this severely, as much as to say that others may seem even happier than they, but that such do not deserve that blessing, for they do not lead such good lives as the "uncommon good." Nevertheless their dour faces and severe talk proclaim them liars, for they cannot be happy. They have no liberty. Not only have they reduced themselves in some degree to the condition of Diogenes, who thought happiness could be attained by shaking off conscious objectiveness, but they surround themselves with prison walls and load themselves with chains, in comparison with which a single teetotal vow is as nothing. They have brains, but do not let their reason guide them; on the contrary, they overburden themselves with maxims, principles and cast-iron rules, and regulate all their actions by these. They refuse to think, and if by chance they do think, they go wrong, for their brains have lost the art of reasoning. Some people always rise at a definite hour, always take a cold bath, always

have ham for breakfast, never hurry for a train. The business of some is regulated on the principle never to trust any person, never to overpay a clerk, "business is business." They go to church or chapel, always on principle, they never drink on principle, they smoke two pipes on principle, lights are turned out on principle, and they take eight hours' sleep on principle. Where, one would like to know, does reason come in? Is it not possible that certain slowly growing troubles are due to a persistence in absolutely cold baths? Would not an occasional glass of wine create a feeling of cheerfulness? Would not the monotony of business and of public charity be enlivened if these were carried out under the guidance of reason and not on the principle of an advertisement? Of course a man who has never used his reason is most likely to make mistakes, and will most certainly be taken in by a fraudulent beggar; he will point to his own failures as proof positive that one must act on principles only. "A man without principle is a danger to society," is their motto, but such a life is a sad life. It may be tempered by a firm belief that these earthly restrictions must lead to a reward hereafter, but if such men would but employ their reason it would be only too pleased to inform them that He who gave it, might like to see it used. Blind instinct was given to the lower forms of life; principles are of the same nature as instincts, and to work on these lines in the world of civilisation, the creation of reason, seems to be a reversal of nature, and as such it must be untrue to life, untrue to the strivings of Energy.

These views are by no means new. Don Quixote is a parody on the life of a man who was guided only by the petrified principles of troubadour chivalry, who talked and argued in the words of his particular classics, who never used his reason and who naturally appears to have been mad. It has been shown how great is the advantage to human beings of being able to bestow on themselves acquired instincts, or accomplishments and principles;

but surely that life cannot be a perfect one which, with the greatest possible haste, forces its reason to transfer every one of its functions to the instinct departments and then lets reason die of desuetude. Such men are even worse than the Brahmins who tie up their limbs till they shrivel up and cannot be used, or the Indians who cut off those of their fingers which are useless in battle, or those Amazons who cut off their right breasts because they interfered with their shooting. These individuals merely cripple their bodies; the man who lives only according to principles cripples his reason, the highest gift which nature is able to bestow on him. Unquestionably he should relieve it of mere routine work, because he would thereby give it greater power of concentration on worthy objects, but to deprive it of all practice and to stifle its activity on the all important question of perfect life is unnatural, is contrary to the tendency of all energy manifestations. Principles in individuals, both good and bad, are the red tape of state departments. Designed to relieve the heads of ordinary routine work, red tape has a tendency to spread over high and low, like brambles around Castle Indolent. The mentally lazy wrap themselves up in a hammock of principles and profess to believe that they are living a perfect life.

Grumbling is not an Eastern trait, Orientals being far too passive in their nature. It is the man with many objectives who makes the best grumbler, at every turn he meets with an obstacle, and at every obstacle he turns in a new direction; he is always discontented. Are his complaints worthy of belief? Is he too misleading himself as do the uncommon good? Unfortunately not, his grumblings are true reflections of his woes, his unhappiness is all the more genuine because it is brought on him by himself, he surrounds himself not with the chains and prison walls of cast iron principles, but with the snares and stumbling blocks of his own flights of imagination. He employs his reason in the building of castles in the air, and groans

under the imaginary load of their ruins. If such men are happy, theirs is the happiness not of the innocent child, not of the soaring bird, not even of the dozing sloth, theirs is the careworn simulated resignation of the dung-beetle grovelling in the bitter filth of refuse heaps. It has wings with which it might fly but it has stunted them by desuetude and prefers to crawl, it could live on flowers and fruit and honey, but prefers excrements, and then it turns its sad look to the outer world and asks to be pitied for the miseries which are plainly of its own creation. Such a life is not perfect, such contentedness is not to be copied. The grumblers cannot teach one what perfect and happy life is.

Unable to find lives which might be taken as ideals of perfection and of happiness, doubts must naturally arise in those who are of a pessimistic nature as to the possibility of perfection being attainable. But the question has still to be asked: What is it that gives pleasure? Nothing pleases more than the gratification of desires, and as desires, whether conscious or blind, whether reasoned or instinctive, are manifestations of the highly specialised form of energy called man, it is evident that energy feels pleasure when it attains its immediate object. Consciousness of pleasure is only possible to beings possessed of feelings, but even in the inanimate world there is something joyous for instance in the rapidity of motion with which a comet rushes towards its attractive sun.

If it be conceded that each man is but one of many manifestations of indestructible energy though of an exceptionally high form, it may be expected that a man will be pleased with the successes attained by other manifestations of energy and by other men, by animals, plants, and forces of nature. Even children enjoy explosions, etc. A sight of the ocean waves is inspiring. Most people are drawn towards unusual energy manifestations. Many travel thousand of miles to look on Niagara, or on

the Victoria Falls, they count themselves lucky to have witnessed an eruption. Crowds flock to every burning house and watch with a feeling of pleasure, awe and pity the death struggle of a poor fallen cart horse, whose last efforts to hold on to life, touch a sympathetic chord on the onlookers, whose strivings are of the same nature. We too struggle to live. It is the same feeling of pleasure at the supreme efforts of the highest manifestations of energy, which drew huge crowds to witness the Roman fights of animals or of gladiators. It is the same feeling which leads people to dwell on great battles and on all great deeds. People are of course still more pleased with their own manifestations of energy, with their own successes, whether due to accomplishments and hard and fast principles, to laborious reasonings or to instinctive actions which are sometimes also strokes of genius. When a thinker has evolved a new idea he feels a pleasure of the nature of pride, even though the new creation may be a useless one. He at any rate is satisfied that his brain, the seat of one manifestation of energy, is working most correctly. A repetition of this experience and frequent feelings of pride engender a wish for other people to share this joy, and he soon may become unbearable to them. With people who live a non-academic life, a practical life, the chances are that most of their mental performances are at once proved to be either wrong or imperfect, they feel foolish or amused accordingly as to whether the mistakes of the brains are corrected from outside as was the case with Don Quixote, or whether they are detected by the brain itself. As already mentioned, many people live on fixed principles and do not think at all; but those who do think, do not invariably follow their reasoned conclusions but frequently ignore them as well as their principles and act in accordance with their instinctive feelings. If these prove to be correct, if successes crown their efforts, then these instinctive actions are called strokes of genius of

which people are also justly proud. Thus Clive at Plassy having in a war council decided not to attack Suraj-ud-Dowlah, changed his mind when he was free to follow his own feelings, and he won. Most great generals have won battles which, according to reasoned considerations, they should have lost. Examples of the intuitive adoption, often by chance, of the right views are innumerable amongst scientific inventions. No council of experts would once have suggested that, by mixing together the most violent explosives, gun-cotton and nitroglycerine, the slow burning cordite would result. Leonardo da Vinci shines like a meteor on the background of Mediæval darkness because he rejected the doctrines of his day while his mind's eye glimpsed the true nature of gravity, light and heat, and his imagination sketched the steam engine. Newton too instinctively believed in attraction thirteen years before his slower reason proved his case. Because instinct is part of the individual, its triumphs give him pleasure. Strength, agility and in fact every human attribute and peculiarity give pleasure to the possessor. These are all manifestations of energy; it is their sum total which constitutes the individual, and it is evident that it gives him pleasure to show off before others not only his intellect, but all his other powers.

There is even some pleasure in succeeding while following rigid principles; well drilled soldiers are proud of their successes and readily ignore the genius who utilised their precision and reliability for his own ends.

There are also people who derive pleasure from their own discomfitures and treat them as practical jokes. They must be happier than others who suffer when even the slightest disappointment reaches them from outside and who resent a harmless joke if levelled against them. The sudden discovery of an incongruity between the sequence of their thoughts and the sequence of external events annoys them, they feel that they are convicting themselves of intellectual weakness and do not enjoy their power of

detecting it. For feelings of pleasure such people are restricted to the gratification of their longings, but even their own successes, bound up as they mostly are with the sufferings of others, cannot produce as pure a feeling of pleasure as is possible in less selfish people.

Charitable people should be happy, for they profess that charity is its own reward, that it gives them pleasure to give. Unfortunately for the veracity of the majority, no charitable effort has ever been a success unless subscription lists were published, and much to Luther's discomfiture he found that the liberality of rich and poor towards the Church practically disappeared when he taught that salvation could be bought without money. The majority of alms-givers seem to hope that their charitable investments in this world will lead to a profitable return in the next, for charity is said to be a good cloak for sins. Strange to say very few people care to witness the contented pleasure which their gifts produce, it is not that they would rather watch a street fight than the feeding of starving children, but it gives them no pleasure to see others pleased. If then the majority give alms and relieve distress, not because it pleases them to see others happy but because it is believed to be a duty, it follows that for them charity is not in itself a reward, and also that charitable people are not necessarily happy, for their feelings are related to those of a slave who obeys orders.

Those to whom charity in its widest sense is a reward are of the nature of saints. Theirs is clearly a double pleasure. Like spectators of sports they feel the pleasure which every energy manifestation inspires, and they also feel the pleasure of having caused this manifestation. Theirs is the pleasure of the spendthrift and the saviour combined. Ordinary mortals seem to have no conception of this double pleasure, but it must be of an intense nature, otherwise saints would not readily have gone to the stake for mankind. The man who can imagine that his own death

will be a supreme benefit to his brothers and who walks to execution as to a feast, must be possessed of a happiness which is beyond the reach of the average man. This is probably a gift of nature, and saints are perhaps born, not made. The strangeness of the possibility of this intense dual pleasure may awaken a doubt as to its reality, it is therefore not out of place to remind the average mortal of the intensity of another form of mutual pleasure which is more common, a pleasure for which people strive as for an only object, a pleasure for which some will risk life, happiness, and even honour; the mutual pleasure of lovers. What Byron says of Parisiana and Hugo, can be said with equal truth of the enthusiastic benefactor of humanity, not only of saintly reformers but of unselfish scientists and inventors, who feel themselves one with humanity. "What unto them is the world beside, with all its changes of time and tide? Its living things, its earth and sky are nothing in their mind and eye, and heedless as the dead are they of all above, around, beneath, as if all else had passed away, they only for each other breathe." This is the spirit in which an unselfish scientist or a reformer enters into a work which will benefit his fellow creatures. The giving of happiness to others, combined with seeing happiness in others is his double or mutual pleasure.

In a milder form this gift of being able to partake of a double pleasure also occurs as true politeness. A truly polite person is able to transplant himself into another person's feelings and to render him those attentions which are most acceptable at the time. This true politeness which is met with reasonably often amongst South Englanders and Swedes, is best rendered in German by the word "Zuvorkommenheit," and is the antithesis of their "Höflichkeit," of which the literal translation should be "courtliness," which latter consists not of transplanting oneself into another person's feelings but in demanding that the other person should transplant himself. The typically

Continental, especially Spanish, politeness or courtliness consists of knowing exactly what is due *from* others, while the true or natural politeness consists in knowing what is due *to* others.

This true politeness is in no sense degrading either to equals, superiors or inferiors, on the contrary some of the qualities which constitute true politeness are also the essentials of true greatness. "Noblesse oblige" is not a mere phrase, and might well be cultivated in the young for their advantage. It will be found that great men have had the gift of transplanting themselves into the thoughts of others and of feeling with them and then acting on what to others looks like inspirations. A great general will have the gift of instinctively knowing what his opponent intends to do under certain conditions and he acts accordingly. The small minded general will know what the enemy ought to do under certain conditions. Frederick the Great seems generally to have guessed correctly what the Austrians would do, Napoleon too, seemed to have been able to transplant himself into the enemy's Council tent, but he, as Emperor, did not exercise the gift, and it had left him at Waterloo, where the powerful Prussian Army had for several hours been passively stationed within striking distance. Napoleon drew the conclusion that this was not an army but a mere skeleton and too weak to attack. He did not divine that the local Commander was delaying action for want of an order from Blücher and, had it not come in time, Napoleon might possibly have saved his army.

The gift of transplanting oneself into the thoughts of others can be cultivated in the young by training them to be truly polite by cultivating "Zuvorkommenheit." In after life it will depend on the individual whether this accomplishment is to be utilised to gratify the unspoken desires of others or to thwart them. Napoleon while young was said to be most fascinating, and therefore truly polite. As Emperor he did not trouble

to transplant himself into other people's thoughts; he had grown to expect that others would transplant themselves into his.

It has been suggested that those who can transplant themselves into others and who can enjoy their joy are of the nature of saints, but even saints are not always happy, their lives are apparently not always in perfect harmony with the world. Pain, in itself, can never be pleasure; it is like force, which has been defined as the change of one form of energy into another. To these people the wrench associated with their sacrifice does not make itself seriously felt if by it the strivings of energy are furthered, but there is no redeeming feature about objectless, though voluntary suffering, and much of the suffering of good men is of this nature, due often to thoughtlessness or to an artificial feeling that pain and hardships are themselves objectives. Some saints have therefore only enjoyed the single happiness of feeling that they were doing good to mankind, and pain and pleasure are balanced in those who suffer while doing good to others. The true saint has pleasure both in his own actions and in the pleasure which he gives.

Saints move but one step in a direction which now seems more clearly mapped out for those who wish to lead a perfect life. Saints evidently feel themselves as much one with other human beings, with other manifestations of energy as the selfish man feels himself alone. But as Life is Energy, the most perfect life should be that which is based on the view that all its manifestations are a unity. Each individual, the human race, the animal and vegetable kingdom, the primitive forces of nature are merely manifestations, more or less specialised, of one and the same energy. A perfect life is a perfect manifestation. Naturally also every function of every animate and inanimate object is a manifestation of energy. The intellect, the senses, the instincts, in fact all the functions of human beings are one, and though to many people it

may be difficult to grasp the unity of the universe, the brotherhood of mankind, and the unity of all life, it should not be impossible for each individual to acquire a thorough consciousness of what he feels instinctively, the unity of all his own functions. From this point of view a perfect life is a glorification, not only of the intellect, as bookworms would make one believe, not of strength and agility as in the knights of old, not of the appetites as the extreme Epicureans imagined, but of a harmonious whole. Perfect life is a perfect and not a partial manifestation of energy; it is all-embracing, on the one hand employing its reason for furthering its strivings to be free, while leaving the maximum possible liberty to its instincts, and on the other hand copying the great principle of Evolution with its aims at improvement and economy, and its tendency to utilise the lower forms of energy for more highly specialised purposes and yet not crushing these.

These suggestions are not new. The Greek cities and other states were built up on the beehive idea of the unity of their citizens. The Christian religion teaches that all men are brothers, the Buddhist philosophy and modern Anglo-Saxon feeling teach that all life is sacred, and now recent science teaches that life and energy are one and the same.

It is not easy to be a truly unselfish citizen, nor a perfect Christian nor Buddhist, and still more difficult is it to identify oneself with all the forces of nature, but it is not impossible to study these manifestations, including man and his works, and to consciously further to the best of one's ability the strivings of energy, which, even those which are noticed in communities, are mostly of a blind and unconscious nature. Naturally such a study and a life based on it must concern itself not so much with the few primitive manifestations of energy, called forces of nature, as with its multitudinous higher forms, with human beings and above all with human ideas. The creations of human intellects cannot of course be grasped

by the instincts, powers or functions which we share with the unreasoning brute creation, they guide us only in relation to the relatively lowly manifestations of energy which constitute animal life. Reason has therefore to be relied on for guidance through the labyrinth of the edifice called civilisation. Unfortunately it is not pure reason which wanders about in this artificial world, but it is the individual of flesh and blood who carries about with him an infinite number of energy manifestations, who feels the force of gravity, who feels the longings of the instincts. It should therefore be the duty of reason to guard these lower powers from coming into conflict with the substanceless and yet none the less real walls of reason's wonderful edifice called civilisation, to guard them against its laws, codes and ideas.

Ethics is the name given to this subject; generally it deals with only one or two of our instincts whereas to be complete it should embrace not only all instincts but also all forces of nature. In the next chapter the middle course will be adopted of enquiring into the interactions of reason and the instincts.

ETHICS.

From what has been said in the last chapter it would appear that perfect life in this world, in the same way as perfect music in the world of music, consists in giving the fullest play to every form of life and its functions, and as these, in the physical world, are partly physical, partly instinctive and partly reasoned, the most perfect life should be one in which neither reason nor instinct cripple each other nor ignore the laws of nature. The latter point is so obvious that it will not be further dealt with, and here only the inter-relation between reason and the instincts will be examined. If only they tended in the same direction it would be very easy to lead a perfect, and therefore, happy life; apparently, however, they have often contrary aims, and it is then ethically difficult to say which should be followed. Unquestionably, instincts, acquired instincts and those quasi instincts which are called principles, are the quickest guides on many routine subjects, so much so that they are generally followed, but they are not infallible and sometimes lead one into most serious dangers. A person may feel hungry, and instinctively, and with haste, feed on poisonous fruits against which ripe reason would have warned him; or, on occasion, he has to avail himself of the acquired instinct of running, and while fleeing from danger falls because reason was paying no attention to obstacles in the road. Old principles may be adhered to once too often after the circumstances to which they originally applied have changed, and irreparable blunders are committed in life, in business, and in battle.

On the other hand, reason, if properly trained, can

carry its owner along paths and towards objects which, without it, would be either unknown or unattainable, but sometimes in great matters, and very often in small matters, the brain acts too slowly to be of use, while occasionally its working is altogether wrong and causes inconveniences and dangers which might have been avoided by trusting to some instinct or principle.

It is thus evident that a perfect life is not one which is entirely dominated by pure instinct as is the case with bees, nor is it a life in which every action is regulated by reason alone. The instincts existed before abstract reasoning made its appearance and before its offspring, civilisation, was conceived. The artificial laws of civilisation are, however, factors to be reckoned with, and reason alone can preserve one from those civilised dangers into which the, in this respect, blind instincts might lead one. On the other hand, reason can give assistance to the instincts by imparting a knowledge of the advantages to be found in civilisation. Reason has a duty to perform by warning, guiding and helping the instincts onward; it has, however, no superior right to interfere with the activity of these instincts in their particular sphere or to crush them. Reason's realm is not in nature but in its creation, in civilisation. If it attempt to modify instincts, which are forces of nature, in the same way as it tries to change laws and customs, which are its own creations, it is interfering. The world in general agrees with this view, and an attempt will here be made to show that if any instinct be exaggerated, the public is more or less outraged, as if something wrong, tending towards immorality had been done, whereas, if reason kills, or partly crushes an instinct, the general feeling is that a sin of the nature of a criminal act has been committed.

The more important instincts have already been briefly named, and it is now a comparatively simple task to review what mankind thinks with regard to each one when it is either being exaggerated or killed.

A child's first act is the instinctive one of taking a breath. Breathing is repeated and continued without intermission to the hour of death, say ten million times in a year. Breathing interferes to a certain extent with some accomplishments of civilisation, such as diving, swimming, shooting, singing and reciting; and reason, applying the experience gained by others, controls or trains breathing to suit artificial conditions. It is difficult to say whether smoking is an interference with the breathing instinct or merely a nerve soother, but in any case all these controlling influences of reason are so slight in their effects that no suggestion of immorality attaches to them.

Reason can, however, restrict breathing, for instance, by tight lacing, and even in this simple case there is a feeling that a wrong, a mild crime is being committed. By going a step further and stopping breathing entirely, either in oneself or in others, one commits suicide or murder. Nobody will deny that murder is a crime, and suicide, condoned by the ancients and by Eastern people, is in Europe at least, also considered to be of the nature of a crime.

The first instinctive action after birth, the ushering in of breathing, is to scream, to exercise the voice producing power. Gradually these instinctive noises give way in man to speech, which is an acquired instinct, or accomplishment. There is, perhaps, no immorality in exaggerating this instinct, but people who are ceaseless talkers are certainly a nuisance to others and are doing themselves harm by losing the power of silent thought. A man who has control over his speech is considered deserving of the highest praise, but a person who refuses to use his tongue for the purpose of speaking, is generally a madman and at best he is reducing himself to the condition of a cripple or a dumb beast. Not to know languages, particularly one's own, is, nowadays, considered an indication that one is uncultivated and vulgar, or, in other words, a social

criminal. Thus it appears that a mild control of the noise producing instinct, such as learning the pronunciation of words, is commendable, but to be noisy or over-eloquent, or to be dumb or illiterate, is by the general public considered annoying or suicidal.

The feeding instinct is the next to appear. It remains through life but changes considerably in man and beast. There can be little doubt but that the feeding of civilised individuals is of the nature of an accomplishment, or an acquired instinct, even if for no other reason than that most of the foods are cooked and spiced, and generally are of an artificial nature. It seems strange that a calf should suddenly turn from warm and sweet cow's milk to feed on bitter, stringy and indigestible grasses, but it is equally strange, if not stranger, that human beings, too, should gradually be trained to give up milk, and after being accustomed to farinaceous food, meat and vegetables, all of a mild nature, should turn to spiced dishes, peppered pickles, chewed tobacco and bitter ales. These things evidently help each other, a smoker's palate craves for something strong. Before tobacco was introduced men used to munch almonds and raisins with their evening drink. Strange to say the labouring classes, the less civilised, do not as a rule relish bitter foods and drinks. They prefer mild to bitter beer and spirits to either. Apparently the feeding instinct of civilised people is almost an exaggerated accomplishment, and is freely criticised as a semi-immorality; it is never a compliment to be called a gourmand, and it is an insult to be called a glutton, a tippler, or drunkard. In all these cases reason, with very considerable pains, has exaggerated the eating and drinking capabilities. It has brought spices and foods from all parts of the world with which to tempt the palate; it arranges the courses of meals so that guests shall continue to eat after being satisfied, it has added spirits and alkaloids and flavours to the beverages in order that drinking shall be continued after the thirst

instinct has been satisfied. It is this laboured exaggeration of the appetite, another name for feeding instincts, which has a tinge of immorality about it, and most people condemn as being semi-immoral the eight-hour dinners of North Germany, now happily of rare occurrence, as well as the similar long feasts of ancient Rome.

A mild control or guidance of the feeding instinct which brings it into harmony with civilised surroundings has been thought praiseworthy in all ages. Foods are cooked in order to prevent contamination, to assist digestion and to shorten meals. To eat simple food, to cease eating before being satisfied, to be moderate as regards drink, has always been considered to be semi-virtuous, but to go a step further and either cease eating and drinking, or to starve others, is by all branded as a crime. Even the partial smothering of the feeding instinct partakes of this nature. The Oriental vice of eating clay cakes and earths is, even by the victims, felt to be of a criminal nature, for it kills the feeding appetite. The eating of the cocaine leaf by the ancient Peruvians in order to be able to work on a minimum of food, was condemned by the invading Spaniards as a capital crime. If it be not criminal it is certainly wrong for masters to underfeed those who work for them, it is both wrong and foolish to starve oneself with the object of remaining slim, foolish because obesity is but a weakness of the system in which fat is produced in excessive quantities. There can also be little doubt but that it is criminal for reason to suggest to an expectant mother to starve herself in the hope that the as yet unborn child will thereby be deprived of the power to live.

Human beings are possessed of a feeding instinct; there is abundance and variety of foods, spices and drinks. A new pasture, fenced off from other mammals, was discovered when fire was used for cooking, and the human race has unquestionably improved through these advantages; stimulants, too, either alcohol, tea or coffee may

be necessary to keep up energies under the severe conditions of modern civilisation. Would it not be sinful to throw these advantages away? Would it be right to reduce oneself to the level of animals, to eat only uncooked and unspiced foods, or only vegetables or only meat? It would then be necessary to feed and digest all day long like a cow, and there would be no time to work or think. Thus, the general view of mankind is that reason did well when it improved those feeding facilities which increase health, leisure and liberty, and here again, as in previous cases, it seems that the guiding and controlling influence of reason is considered to be something good, even moral, whereas for reason to exaggerate the feeding instinct is thought to be somewhat immoral, and to crush it, and especially to kill this instinct, is considered criminal.

The two instincts which next present themselves are playfulness, or destructiveness, and appropriativeness. They make their appearance very slowly, both in children and in beasts. Appropriativeness is at first attended by inability on the part of a child to grasp the idea of foreign ownership. In its own mind a child has a full title to what it finds, and resents being deprived of its acquisition, no matter whether the article be valuable or not, nor whether it was found in the gutter or in a casket. A child shares this trait with beasts, with grown-up savages, and with natural criminals. Education, *i.e.*, the controlling influence of other people's reasoned experiences, is largely directed towards modifying this instinct in conformity with the institutions of civilisation, partly by inculcating the idea of foreign ownership, partly by directing attention to what is valuable and valueless. But when maturity is reached, when children have left school, a marked difference is noticeable in individuals. Some devote all their energies, mostly mental ones, towards exaggerating the instinct of appropriativeness; they are called thieves, robbers, swindlers or misers; in others, in whom this instinct was perhaps weak, education

may have crushed or killed it. People who live up to their incomes or beyond them, who squander wealth instead of acquiring it, who give it away and possibly starve themselves, or ruin the futures of their families, are called not only foolish, but spendthrifts; and in this latter class must be included those charitables who give whenever they are appealed to, sometimes parting even with the money entrusted to them by others.

As already mentioned, appropriativeness is a natural instinct which differs much in different individuals, and naturally in different nationalities. Chinamen and Frenchmen are frugal and saving, many Oriental nations are of a grasping disposition, while others, like the Irish and the Poles, have this instinct so weakly developed that they might almost be called spendthrift nations. Here again the general view is that either to exaggerate or to crush this instinct is not normal but either immoral or criminal.

Playfulness, the other youthful instinct just mentioned, including destructiveness and cruelty is, like the previous one, shared by us with animals. A lion's whelp is hardly more cruel to its captured defenceless victims than is a child to its pets, and if this instinct be encouraged, as amongst warlike savages, and even amongst the foremost of ancient nations, generations after generations grow up to enjoy scenes which ought to make their blood curdle, at least so we, who are trained differently, think. Accustomed to indoor life, it is to most people revolting to see animals tortured, be it in the street or in the bull-ring. But it is dangerous to dogmatize, for through some cause, which is not very clear, modern occidentals are brought up to attach to life a value which would astonish every ancient community, and some eastern ones of to-day. This is not an unmixed blessing; people now seem to fear death, whereas, many of the citizens of the ancient states valued even their own lives as nothing compared with the interest of the states. It was for these ancients that the

largest known theatres were built, in which they watched the human form being torn to pieces by wild beasts, to be followed by the more terrible sight of these animals placidly gorging themselves on the still quivering limbs of men and women. There, too, men, women and children watched, and by their shouts and signs directed the killing of contending gladiators, and even to-day practically every German student, by taking part in or watching duels, is being trained to look placidly on the blood which will have to flow if the Roman world empire idea for which their rulers seem always to have wished, is again to become a reality. Such encouragements on the part of the state, or on the part of public opinion to exaggerate the cruelty instinct, possibly in the belief that cruelty and courage are identical, strikes most modern Europeans as highly immoral.

If, however, a people were to set its face against the infliction of pain, whether on man or beasts, they would become more Buddhist than Buddha. The result would be that the particular nation would have to give way before men who are warriors, as the Burmese and Tibetans had to give way before us. Criminals could not be punished nor could children be led in the right paths, and the high skill of surgeons would never have been attained if the infliction of pain had been universally condemned.

Here again it seems that the public feel that it is equally wrong to exaggerate an instinct or to kill it.

The many-sided instinct of playfulness of children develops in another direction. It is met with every day in the familiar form of sport. This is much encouraged in England, or rather it has become a necessity to balance the monotony of classical learning at school, so much so that in spite of its many advantages, foreign nations see in it the cause of some of our shortcomings. At school, sport certainly takes away all spare time which might be devoted to other matters than classics, but the excellent disci-

plinary rules which are associated with all sports are of the nature of acquired instincts or accomplishments and are often the healthiest guides in after life. Thus, in England more than elsewhere, business partakes of the nature of a sport, and American and Oriental methods are not liked because they are not "the game." Englishmen expect and give fair treatment. If they come across men who do not conform to their accepted rules of business such are severely left alone if this be possible, otherwise, unless Englishmen quickly change their fair play ideas and indulge in real commercial war, their adversaries, for such they are now, have the advantage. Herein the reason may possibly be found why other commercial nations with other business codes are regarded as being less honest than ourselves. With them business is the business of doing each other, here, business is a game, serious enough, it is true, but one in which "to live and let live" is supposed to be the guiding principle. At any rate, there is no nation in which commercial laws are comparatively so few as in England, because the customs of the trade, *i.e.*, the rules of the game, are supposed to be all that is necessary. It is the same in politics, men from the same public school and college, who, in private remain the best of friends, will join opposite camps for the mere pleasure of playing against each other in a game in which the interests of the public don't count and in which the electors are mere pawns which may, by the rules of the game, be moved about by means of political lies and sophistries. They will outdo each other in speeches which shake the Constitution, and laugh together over the effect they have produced.

Unfortunately, the sporting idea is also carried into wars; thousands of Englishmen consider native wars mere massacres and think them highly immoral because the savage opponents are placed at the unfair disadvantage of having to fight with spears and swords against firearms. Even our soldiers have shown that they, too, were often surprised

that the enemy did not play "the game" as he should. To carry an instinct to such extremes is simply childish, and yet, Englishmen of to-day may feel excused when they review past and distant customs which have had their day in spite of the saying, that all is fair in love and war. When Epaminondas, Philip of Macedonia and Alexander had recourse to strategy, retreating without being beaten, and making unexpected flanking movements, they were merely breaking through the rules of the game of war which had grown out of the half friendly struggles at Olympia and in the battles between the Greek cities. The German tribes had their rules of the game of war to which the Romans did not conform. The Italian mercenaries had evolved a wonderful set of chivalry rules which resulted in their battles being attended with fewer casualties than modern manœuvres, and the French and Spanish troops of the day who had no scruples about adopting any means towards success, made easy conquests. They also gained easy victories over the Aztecs whose rule of the game was not to kill enemies but to lasso them for sacrifices to their gods. Although not true, the legend about "Gentlemen of the Guards fire first" is illustrative of the absurd lengths to which the feeling that war is honourable sport, can carry men, and one may well stand amazed when reading that at the Battle of Trafalgar the custom was adhered to, both by English and Frenchmen, that three deckers were not to fire at single decked frigates or at rowing boats. It is, in fact, almost comical to hear that H.M.S. "Euryalus," the signal frigate of Nelson, whose destruction should have been almost the first aim of the French fleet, was not fired at, not even when she towed Collingwood's crippled "Royal Sovereign" into a position from which more effective broadsides could be delivered against the French.

Thousands of instances, not only from English wars but from those of other nations, could be cited to show that

sport in war, *i.e.*, playing "the game," is foolish and has led to many disasters. There seems to be but one rule in war, that all is fair, certainly unscrupulous men like Cæsar and Napoleon did not shrink even from the meanness of breaking their words of honour, if that served their purpose. Being professedly honest men there was no lower meanness to which they could resort.

In this case, it is seen once more that the public feel it to be a wrong, of the nature of immorality, to exaggerate playfulness, or the idea of sport; on the other hand it seems to be equally wrong and even criminal, to crush it. Some parents, and even whole nations are sinners in this respect. In countries where military discipline is almost a cult, the spirit of most of the children is inevitably broken by early discipline, and in after life they are relatively resourceless in face of danger, and save themselves only by acting on definite principles, or in military matters, by obeying orders.

Jealousy is another instinct, or rather trait, which makes its appearance at various ages and in all grades of intensities. There are two distinctive forms of jealousy, the one known as dog-in-the-manger jealousy, the other is a pig-like jealousy. The former is the more common type and a very hateful one too, as it leads to hateful acts: all possible rivals for wealth, honours or love are mercilessly attacked, often in spite of the criminal law, and in its extreme form this jealousy leads people even to destroy the objects which they cannot enjoy, fearing that they might give pleasure to others. Lassell broke up his great four-foot astronomic reflector in order that no future astronomer should enjoy the heavenly sights which had been his pleasure, and unsuccessful suitors have over and over again murdered the object of their adoration rather than that others should have enjoyment where they could not find it; women in particular will often do most unreasonable things so as to prevent others from gaining that for which they long. This form of jealousy is also a rank

weed in politics. Alcibiades, when the Athenians refused to have him as their leader, taught the Lacedemonians how to destroy his own state. His type survives to this day, especially in England.

It is a well known fact, or what amounts to the same thing, people are fond of believing that if one pig be kept in solitary confinement it will not eat sufficient food to fatten, but if two be led to the same trough they will both gorge themselves to the point of bursting. They, apparently, eat and eat out of a jealous feeling which makes them believe that the harder they work to enjoy themselves, the more they eat, the less enjoyment and food will be left for the other. This form of jealousy is exemplified in the human race in various walks of life, and is often the mainspring of amicable rivalries. German students vie with each other as to who can drink deepest, sportsmen vie with each other as to who can run or jump furthest and highest or break records. It is the same jealousy which prompts many men almost to kill themselves in their efforts to amass more riches or more state honours, and in the East more wives for their harems than other men.

Jealousy in these two forms, like all other instincts, does not obtrude itself on the consciousness of the sufferers, who hardly ever realise their condition. This is, no doubt, the reason why jealous people so readily commit the immorality, for which the world always despises them, of intensifying this instinct more and more by allowing the most trifling incidents to fan it into a flame. Jealousy is not confined to the human race, nor to love affairs; nevertheless, it is in love affairs that jealousy appears in its harshest and most unreasonable form. The cause for this is that all instincts are unreasoned, and love and jealousy appear even more unreasonable than all the rest; if, therefore, reason uses one instinct to intensify the other, the result is a most unreasoned condition of things, and onlookers cannot help being amused when this mad

combination occasionally drives individuals to spend their time, money and happiness in the search for confirmation of their jealous suspicions, which, if they found it, would unquestionably make them more unhappy than they are.

It is difficult for men to grasp the jealousy of women, except to feel occasionally that in love affairs it is more wilful and more unscrupulous and blind than love itself; in other matters it is too complicated to be even faintly understood. The jealousy of men, too, is difficult to understand, or rather this again is a case of reason refusing to let the instinct appear in its true form, but, as far as can be seen, men are not naturally jealous, especially not in sexual matters, but fairly jealous as regards property, which is one of the proudest creations of the male intellect. This sounds untrue, for do not injured husbands fight duels and rush into divorce courts, whereas many speculators lose fortunes without wincing. That is quite true, but a closer examination of these cases makes it appear that the speculator is merely adhering to the rules of "the game" under which he has won and lost scores of times, and husbands are generally jealous as regards wives because they still look on them as property. They are even more jealous as regards their mistresses, probably because there are no conventions with regard to them which hide the fact that they are being paid for. On the other hand, not ten men in a thousand are jealous with regard to women who do not belong to them. Who that associates with the hundreds of thousands of prostitutes cares a straw whether Tom, Dick or Harry, friends or strangers, high, refined, low or vulgar, were the favoured ones a few hours earlier? Careful youths will even club together if their tastes are inclined towards having a mistress while their means are as yet too limited for the exclusive luxury. How many lovers of married women are jealous of the husbands? In fact, for many men adultery exerts the same attraction as does the chance

of cheating another man out of his property, or getting the better of him in betting, gambling and business.

The subject is an exceedingly complicated one, but apparently men have codes not only of honour, but also of jealousy, and under certain conditions men, if they wish to remain members of society, must profess to feel insulted by things of which Orientals would think nothing, and similarly men have to simulate female jealousy and fight duels and rush into divorce courts when their inborn jealousy instinct is practically dormant and has to be artificially intensified. This intensification is felt to be an immorality, even though it may be carried out with as much naturalness as possible. The crushing of jealousy in men should be a crime, unless men are not naturally jealous in love matters: yet a man who follows the advice of Plato and other philosophers and refuses to be jealous and even lends his wife to friends, is not pitied but despised by society. It is different with regard to women; history mentions many Queens who may be pitied for having had to smother their jealousies. Here it is an outside influence which is condemned for crushing an instinctive act. If jealousy with regard to property, which is often very strong in man, be artificially smothered, and if he become a spendthrift, he strikes us as being criminal rather than immoral; and if ambition, another form of jealousy, be stifled, especially in military men, one feels as if they were criminals and unfit for their posts. A man who is not ambitious, who is not jealous for his reputation, is practically unfit to occupy a leading position.

Mimicry, deception and lying, like jealousy, have been classed as instincts, but the uncertainty of their appearance and the extraordinary range of intensity of their manifestation, both in different individuals, and in the same individual at different times and in varying conditions, make it very difficult to select a suitable standpoint from which to contemplate them. This difficulty is appa-

rent if the question be asked: Is truth-telling a virtue, or is it a foolishness or a crime, or merely contrary to codes of civilisation? Is it immoral to lie or is it criminal? Then there is the great unanswered question "What is truth"? and the proverb which sounds reasonable enough—"Never tell the truth—not about yourself for it is nobody's business—not about others, for it may do them harm." Goethe also says that those who have told the truth have generally been crucified or burnt.

Lying is but a form of deception: animals cannot speak but they have the power of deception which Evolution has improved and developed to such an extent that it has influenced the colourings of living beings and is known as mimicry. Is not this power, or rather this natural gift of deception, an instinct? If it reappears in a modified form in the human race, can it safely be said that it is not instinct? Then, however, the question arises, is it immoral to intensify this instinct, and is it criminal to crush it?

Assuming that it was natural on the part of primitive human beings to deceive enemies, then clearly when reason invented speech, whereby deception was facilitated, it was already intensifying deception into the form known as lying. This intensification rather than the deception should strike one as being immoral, and, right enough, for there are many people who abhor lies, but who have no hesitation in deceiving their neighbours and competitors by acts. They are doing no worse than the fox whose instinct prompts him to feign death in order to jump at his unsuspecting prey. If the conditions of life, as for instance, business life or military life, demand that a competitor should be deceived by being kept in ignorance of one's intentions, and if this deception takes the form, in one case, of asking a merchant for the price of certain goods which the other has no intention of buying, because he has a large quantity for sale and wishes to keep up the market price, or if, in the other case,

a commander of an army makes a severe frontal attack while preparing for a flanking movement, no reasonable human being will class these deliberate deceptions either as crimes or immoralities. If asked for an opinion they will say that these men evidently understood their business and did it well. The verdict would be a different one on men who might crush their deceiving instincts by adopting a principle of never deceiving. If the merchant admitted the truth that he had to throw a large quantity of some commodity on the market whereby he would depress the price before he sold, or if a general were to be quite unguarded in his movements and allowed the enemy to inform himself about the truth of his intentions before they were carried out, both would be considered culpable. A middle course is often steered, and the middle course differs in all countries and in all classes of society. The commercial codes of England, America, Germany, China, and Japan differ, one might be tempted to say, as night and day. The straightforward transaction in one country would be a foolishness in another, and what would be classed as smart by one set would be condemned as dishonest by another. The same remarks apply to society codes. Expressions which are politeness in one country and in one set are lies in another. For a servant to say that her mistress is not at home is not a lie, it is merely the best that can be done in English for saying that her mistress is not at present receiving visitors.

A lie is a deception by means of words, but words are very imperfect conveyors of ideas and much depends even on the intonation given to them by the speaker, or heard by the listener. Words which, taken literally, mean one thing may if sounded sarcastically mean the reverse. It is therefore not at all unnatural that people who find that they have been misunderstood when speaking the truth to the best of their ability, should soon learn to use words in a double sense for the purpose of deception. This is immoral according to the views here expressed, for reason,

by means of the imperfections of speech, its invention, is facilitating and exaggerating the deceiving instinct. In conformity with this view, society has decided that the word "liar," if applied to a man, shall be an insult. In consequence of this code some sects profess never to tell lies, but neither they nor others bind themselves not to deceive, and Bismarck is said to have boasted that he was able to mislead diplomatists by telling them truths, because, in their profession, they believed all statements to be lies.

However, even the strictest sticklers cannot escape telling lies. If one man asks another about his business or private affairs he is committing an impertinence, and should not complain if he gets a misleading reply. This is perfectly well understood for the saying is "Ask me no questions and I will tell you no lies." The legal profession finds it profitable to go a step further and even encourages misstatements on oath. Every defendant gains the experience that he has to state in his affidavit that certain things are not, although he knows, and it is palpable to everybody, that they are. He has to do this so that the other side must take the trouble to prove these things.

Education is a state institution, and the exclusiveness of our public schools, in which boys of only one class meet each other, has led to the adoption of a code which raises to the level of a virtue what is more like a crime, the utter suppression of the deceiving instinct. It should be remembered that the Spartans were even taught to steal. It is, of course, a great convenience as regards management by schoolmasters to get their boys into the habit of not deceiving, but it is a crime towards these boys if, at the same time, they do not learn that "speech was given to man in which to hide his thoughts." On the other hand, though this is beside the present question, this training, to which most well-to-do English boys are subjected, has had a beneficial effect on international intercourse, because

the world is being educated into the knowledge that truth-telling, which is a much easier performance than lying, may be indulged in without serious consequences.

The other extreme is also not unknown, and many parents, guardians, or teachers, by being too strict and too severe, drive children into an exaggeration of their natural deceptive powers.

It will thus be seen that, although the educational maxims of England, more than those of any other country, aim at reducing the intensification which reason's invention of speech gave to the deceptive instinct, and although children thereby grow up in the belief that truth and deception are extremes of good and bad, and that truth is a positive quality and deception its negation, yet it is probably more correct to say that deception is a natural trait of humanity and therefore a positive quality which seems to have been evolved in all living beings, partly for defensive and partly for aggressive purposes, and, therefore, resembles speed and strength with which animals are endowed for the same purposes. From this point of view truth telling must be looked upon as a negation, a weakness, a mental laziness, just as sloth, muscular laziness and bodily weakness are negative quantities, and that no doubt is the reason why in this case also, to exaggerate the deceptive faculty should be, and is, considered immoral rather than criminal, and to crush it, to have no control over one's words and actions, to tell truths about oneself and other people and reveal one's intentions and doings is semi-criminal rather than immoral. In fact, according to English law practice, truth telling about other people is a more serious libel than exaggerated lying.

The all powerful instinct of sexual love, which should now follow, will be discussed in a separate chapter. In the female sex it is the precursor of the last and also the most beautiful of her instincts, a mother's love for her offspring.

One might imagine that there could be no wrong, no immorality in encouraging this instinct to excess, and yet it is felt that a mother who spoils her child with too much love is not only doing harm, but the public often look on her's as a selfish love which sees no good in any children but her own. On the other hand, the mother who can hate her child is a monster seeking its equal in vain even amongst wild animals. Yet there are such women, though it is to be hoped that they are not typical of their sex. Generally they have not the courage to kill, but they would if they dared, and every one feels that their intellects, which have led them to crush their motherly instincts, are committing crimes. Possibly a child may disappoint a mother's ambition either by being deformed or weak-minded; perhaps it is of the wrong sex, and a hoped-for inheritance thereby passes to others; a heartless mother may look on social functions as the aim and object in life with which children naturally interfere, or, and this is perhaps the most frequent cause, either nature or manly occupations have created unwomanly women. In all these cases it is reason which has killed a most lovable instinct, and if it repeats this murder in generation after generation it surely must create a new and horrible brood, without love, selfish and cold female forms with fiendish natures. Exaggerated motherly love is a more pleasing picture, but no one will look on a mother as being a model one who loves her child so much that she spoils it. Men cannot fix the point where this love from being natural changes into an exaggeration, for men may be kind to children but they have not the mother's instinct which, even in wild animals, will face death rather than abandon the helpless. It is, however, quite noticeable that single children and younger children of large families, who experience a mother's love over longer periods than do the elder children are usually spoilt.

A few illustrations will it is hoped make clear the

nature of the control which reason can or should exert on the instincts.

Reason's discovery how to produce fire and how to make food more easily digestible has already been mentioned. But having created this new world in which the instincts are not at home, reason might certainly regulate the details. Feeding must not be continuous as with cows, artificial flavours must not be used to hide poisons, etc.

Children whose natural instinct incites them to gnaw bones and other hard objects, whereby the circulation of the blood in their gums is strengthened and good second teeth result, as in Sweden, should not during their early years be tempted with porridge, soft bread and sweets, to give up a healthy exercise in which their toothless parents are unable to indulge.

When man's prehistoric ancestors lived in caves they may not infrequently have been troubled with foul air which would settle on the ground and suffocate them unless they raised their heads as high as possible, and an instinct appears to have been evolved in men and beasts to raise their heads as high as possible whenever a sensation of suffocation seizes them. Under the above mentioned primitive condition of life this instinct would be a safe guide, but now that reason has built rooms and invented fire a thing which no instinct can grasp, reason should control the tendency to raise the head whenever it is face to face with fire, heat or steam in a confined space, because hot air, smoke and steam occupy the upper portions of rooms, whereas the pure and cold air creeps along the floor; and when exposed to the above dangers, the reasonable but not instinctive thing to do is to lie low and to crawl along the floor, if necessary almost touching the ground with the mouth. Then however a new complication arises with which reason has to concern itself, for any person in a crowd, for instance in a burning theatre, who throws himself down is sure to be trampled to death.

Similar remarks apply to the instinctive throwing off of

clothes when exposed to great heat. Reason should control this instinct to the extent of crushing it for the time being, for experience, and not the instinct, teaches that clothes are as much a protection against heat as against cold. Iron workers who have to stand near hot furnaces are often very thickly clothed. People with less experience of fires, such as theatre goers, when face to face with a conflagration, generally, in their frenzy, tear off every shred of clothing and thus expose themselves to the double danger of being blistered as well as being suffocated.

Human instincts as well as the five senses have been evolved, under natural conditions of life, the latter have been the reliable and only guides as long as reason had created no civilisation, and the reliability of their workings is truly wonderful, but it appears that certain birds have no sense of smell, and that we, and probably no animals have any sense of electricity and of magnetism. It cannot therefore be expected that any instinct, except perhaps the dread of all unknown and of everything uncanny, should protect people from the dangers of electric contrivances of civilisation. It is equally unreasonable to expect that any of the inborn instincts should be able to protect people or lead them right amongst the innumerable and wonderful inventions and institutions of civilisation. Reason has erected them, reason alone can perceive them and reason is the only guide amongst these artificial wonders.

It would thus appear that the human intellect and the human instincts live in two separate worlds, the latter in the world of nature of which they form an integral part, the former in a world called civilisation, which is its own creation. A ship lives a similarly double life, its hull rests in the water and its natural characteristics, its instincts, as it were, are buoyancy and stability. The sails exist in the air and together with the masts and rigging catch the power which is in the wind, and the ship, which would otherwise merely float upright, is

made to sail. The sails may be so set as to steer the ship without the use of a rudder. Sails also modify or control the general instincts of the hull, and the stability is, in a sense, modified as the vessel heels over, and the floating power which once acted only upwards is partially changed into the horizontal push which moves the ship onward. Hull and sails act in harmony and constitute a perfect ship, and man, if he is to be a perfect manifestation of energy, should harmonise his instincts and his reason into one similarly perfect whole.

Suppose that the sails of a ship are too important, too large, then the stability, instead of being merely controlled, is crushed, the vessel is upset and sinks and is a ship no more. Or again, the overbearing sails are no match for the stability of the ship and therefore break the masts, the ship thus becoming a derelict.

Another simile can be drawn by letting a sailing ship, in all its perfection, represent a human being. After centuries of seafaring and constructive experience, finality seemed to have been reached a few decades back when the celebrated tea clippers, "Fiery Cross," "Taeping," "Sir Launcelot," "Thermopylæ," and others were constructed. Their planks and timbers were of best mahogany, fastened with copper bolts and sheathed under water with copper. Their rigging was of the lightest, compatible with safety, and infinite pains were taken to give to the hull the most perfect shape. These racers were amongst ships what Chippendale furniture is amongst household goods. They were also manned by the best sailors and the best navigators, who here represent the brains of the ship. These men steered their vessels not only in and out of artificial docks, but across oceans from one dock to another, and their knowledge embraced not only the depths of the waters to be traversed, but also the nature of the winds and currents, of which advantage had to be taken in order to make the quickest possible passages. These men, the brain of the ship, also knew much of its constitution and

characteristics, its instincts, but they interfered with them as little as possible. With the sails properly set, only a bad steersman is always moving the rudder. Unquestionably, each passing wave throws a vessel somewhat out of her course, but she returns to it instinctively as it were. Each puff of wind merely causes a good ship to heel over and she thus relieves herself instinctively of the excessive pressure which in a badly designed ship would tear the sails, break the masts, or upset the vessel. The natural buoyancy of the vessel also causes her to rise and fall with each passing wave. The good navigator leaves the instincts of the vessel to deal with the forces of nature amongst which it was evolved. The steersman should, of course, have his hand on the tiller, partly to let him feel that progress is normal, partly to be ever ready artificially to alter the course so as to evade those dangers which the ship cannot grasp; there may be a derelict or breakers ahead or a white squall, and the navigating officer will always be on the look out for changes in the weather which may necessitate re-trimming of the sails or shortening them. The vessel is like the human body with its instincts, which have no consciousness of the surrounding natural forces, but they respond to them or evade them in the same way that a ship rises and sinks with the waves and heels over when struck by a strong gust of wind. The steersman and the navigating officer represent the intellect, their actions are based on consciousness of surrounding dangers and artificial devices. The hull is not conscious of submerged rocks though these are recorded on charts and known to the officers, nor can a ship perceive artificial channels and quay walls, lock gates and other devices of civilisation. It has to be guided and its course controlled amongst these artificialities by the navigating officer, by the ship's intellect, but in the open ocean he has no business either in one sense or another with the natural properties, the instincts of the ship, and similarly the human intellect has no natural right to interfere with

human instincts. The intellect can do little good and much harm if it interferes either by exaggerating or crushing instincts which have been evolved amongst the forces of nature. The control is necessary, and should be of the best, but chiefly when the human ship finds itself in dock amongst the quay walls, locks, buoys, and other artificial devices of civilisation. But even here, although it may be necessary to place out of action certain instincts, represented for instance by sails, and to rely on ropes for motive power, it would be not only foolish, but criminal, to crush others, just as it would be foolish or criminal to destroy the buoyancy of a ship by letting water into her and by sinking her in the fairway and thus obstructing others in their legitimate movements.

Contrary to the teaching of the dogmatists, it would thus seem that, where one meets immorality and crime, blame attaches not to the instincts, which are blind and if left alone would behave naturally, but to reason which interferes with them.

URBANISM AND RURALISM.

Before dealing with the question of sexual ethics it is desirable to glance at a few of those edifices of civilisation which reason has erected for the purpose of controlling sexual matters, such as marriage laws and conventions, etc., but seeing that this subject is largely mixed up with the state idea of property and may even have grown out of it, the two questions should be treated together. This chapter will, therefore, in a way, illustrate without actually reverting to the subject, what was meant in the last one by those edifices of civilisation amongst which reason would have to steer the instincts of appropriativeness and saving, in order that harm should be averted, and at the same time it will indicate what are the edifices of civilisation amongst which reason has to guide the human sexual instinct if it is not to be led into trouble.

It was at first intended to entitle this chapter Puritanism, but that name has from the days of Queen Elizabeth been appropriated by religious sects whose ideas were then slowly growing to maturity, and then also the meaning of the word has been perverted, for Puritanism was never pure, it embraced much hate and an excess of intolerance, the persecutions in the puritanical provinces of North America being as cruel and even more merciless than those practised in Roman Catholic and Protestant Europe of the day. The word Urbanism has been adopted because it is a comparatively colourless expression and stands in natural contrast to Ruralism out of which it has grown and without which it cannot exist. Agriculturists are of the nature of those cells previously mentioned which manufacture cells for the cell consumers and energy producers, for they grow food for the consumers who are

producers of ideas and who mostly congregate in towns. Neither ruralism nor urbanism is a primitive form of national life for each has been created as it were by a germ process of splitting up. It was only when the abstract reasoning power of man had advanced sufficiently to permit of combinations being entered into for the purpose of robbing each other of their respective properties that the differentiation was possible. The process might be expected to be brought about by one set of communities becoming thriftless robbers while the other grew to be more exclusively producers and thrifty defenders. The differentiation is typically illustrated by the quarrel of Cain and Abel. Then, as now, it was the thrifty husbandman not the thriftless hunter, who emerged victorious out of the conflict. This is but natural, for the methodical systems on which industrial life are based if applied to war must lead to victory over the thriftless waster of goods.

Modern civilisation is far removed from the primitive conditions under which this conglomerating and splitting up process was first started and savage tribes are too much under the influence of civilisation and are too much guided by what they know of civilised methods to be a safe indicator as to the growth of industrial centres, but by enquiring into the Middle Ages conditions of some little town or village it will not be difficult to form some idea of the growth of ancient towns both on the shores of the Mediterranean and in the East.

Let it be assumed that following on a long period of ignorance, robbery, and strife, human reason had at last made a sufficient number of inventions to permit of towns being built. The more savage members of the community or perhaps a distant conquering tribe would occupy the land, while the timid, peace-loving and ingenious members would be drawn to the walled towns. They would have to obtain their food from the country and would naturally improve agriculture in the surrounding

lands and do all in their power to make trade easy and safe. During certain periods of the growth of towns, outsiders and even savages would be attracted to them, and the experience would soon be gained that these characters were undesirable additions, and that even the children of mixed marriages were not of that docile nature which is expected to be found in good citizens. The result would be the creation of a spirit of exclusiveness and intolerance which is one of the chief characteristics of Urbanism. It was of an intense nature in all the ancient Mediterranean towns, notably in Greece and Italy, where strangers could by no possible means become freemen. The savage notions of the German tribes which overran the Roman Empire almost crushed this custom, but only for a time, and as soon as it was possible for small towns to spring up amongst hordes whose tendency has always been to fight, the spirit of intolerant exclusiveness was again rampant and was perhaps even more powerful than before, for the artisan guilds, who under the Roman sway were despised non-fighters, had now to arm themselves against the savage Germans, and they constituted the only remaining element of the Roman Empire which was never entirely subdued. This is one of the main reasons why the guilds of the Dark Ages held a relatively high position in towns.

The condition of a small town of the Middle-Ages would be roughly as follows: It would be surrounded by a wall, it would own certain surrounding lands and probably a few observing towers, its constitution would be republican, it would have its own laws which would exclude undesirable immigrants, including warrior knights and even priests unless they voluntarily gave up their privilege of being judged and punished only by the superior of their order. The internal arrangement of such a town, the size being limited by the outer wall or by the decrees of the overlord, would have to be as well ordered as the arrangements on board a man-o'-war. There would be a place for every-

thing and a duty for everybody, the trades would be carefully arranged in guilds, whose masters would attend the town councils. The number of people who might and who should live in certain sized houses, the number of horses to be kept, the amount of grain which had to be stored or which might be sold would be carefully regulated. After a time even the nature of the dresses and ornaments would be fixed by regulations of the town council, so as to prevent rivalry in wasteful extravagances. Of course, as the main object of town life was to make property secure, laws against stealing and swindling would be very severe, and then, even if for no other reason than that people who make regulations also love to extend them in all directions, sexual matters would be very carefully regulated.

The Greek and Roman conditions were similar to, but not exactly like, ours. The results were of course not the same, but it is necessary to describe at least their marriage laws because of their influence in upsetting Germanic customs and in moulding ours. It appears that in Greek towns none but true born citizens could marry. Others, even slaves, might live together, but these combinations lacked the essence of true marriages, for no child whose father and mother were not true-born citizens could become a citizen nor inherit property. Such a child was from the modern point of view less legitimate than the child of handfasting marriages, for Germanic fathers provided for all their children. Then also in most ancient towns a marriage of two citizens was a real marriage only if the dowry of the bride stood in some definite relation to the property of the bridegroom. A girl who married a man without bringing him a dowry which was comparable to his own property was amongst Romans, Greeks, and Jews called a concubine. Her children would not be on a level with those of real wives. Real marriages were usually celebrated by festivities, but these were not essential. Even in these cases the mere living together as man and wife constituted marriage, provided the property and

other quality conditions were fulfilled. In cases where a man wished to marry a poor but true-born citizen girl, it was in some cases necessary, if her children were to inherit his property, that he should present his bride with the dowry which was prescribed by custom or by the laws of the state. In some towns a mere form of receipt sufficed, the idea being the same, viz., that the bride had entered the bridegroom's house as his equal and not as his servant. If she lived with him as an inferior, and therefore not as a real wife, she might subsequently be supplanted by a woman of higher position.

In Rome the matter was somewhat more complicated, because of the *gens* or patrician families which alone constituted the true Roman community. A Roman could only marry a girl out of his own or another *gens*. If he lived with a girl of a lower grade he and their children sank to her level and the husband's property reverted to his *gens*. In the Imperial days of Rome many outside families and even barbarians were raised to the level of *gens*,—which explains why there are gentlemen in England—in order to qualify the individuals for contracting true marriages, but the refusal of the Roman Emperor Honorius to admit Ataulf, King of the Goths, to be his equal, practically prevented his handfasting marriage according to Germanic custom, with Placidia, the Emperor's sister, from being a real Roman one. The Emperor was not injuring his sister's social position, for subsequently she married an equal, but he would not elevate Ataulf and his children to the level of patrician Romans. In a different form Charlemagne held the same view, and this restriction still survives in many reigning families in so far as that the sanction of the head of the family is necessary in order to legalise a marriage. In England, Parliament has accepted the obligation of deciding this point, a marriage of a royal prince or princess without Parliamentary sanction being simply no marriage, even if solemnised in a Church and duly regis-

tered. The offspring of such a marriage is not entitled to any of the privileges of rank of either parent and can inherit nothing from them except by testamentary will. Continental morganatic marriages are of the same nature. The outward ceremonials are carried out but the law is not complied with.

The Romans recognised a secondary form of marriage between those who did not belong to the patrician *gens*. These were of the nature of contracts. Two people could also become man and wife by living together as such for twelve months. If the wife did not wish to be subjected to the formidable power which the law gave to the husband, she had to absent herself from his house for three consecutive nights. Of course, this form of marriage was customary chiefly in the lower classes amongst whom questions of inheritance would be of little importance.

Now the object of the high class marriages both in Rome and in Greek towns was the desire to preserve the purity of the patrician race, a tendency which, strange to say, is almost wanting amongst Semitic nations, but is strongly developed amongst the Hindoos and amongst the Mongols. In fact in India the caste system seems to have been devised for no other purpose than to preserve the leading castes, believed to be the survival of invading tribes of Germanic and of Semitic origin, from contamination with the lower castes or aborigines. By marrying into a lower caste a man or a woman is degraded to that level, and his or her children lose all the privileges of the higher caste which is therefore never recruited from below. Similar conditions prevailed in the Greek towns and on account of the forced seclusion in which free-born Greek women were necessarily kept, for they were doubtless as independent in character as their husbands, Greek wives seem to have been socially dull objects, and it was customary not only for the average husband, but more particularly for their philosophers and leading

statesmen to court the society of gifted and accomplished women and to be inspired by them. From a modern point of view this would be an immoral custom and possibly too from the standpoint here adopted, that it is immoral to exaggerate an instinct. This may be the case, but the whole social arrangement of Greek civilisation seems to have been designed in such a way that reason should have as little trouble as possible in guiding the sexual instinct. They had laws against adultery with very severe punishments against strangers and slaves, which is but natural, but every town had its temple of Venus, which was merely a sanctified house of pleasure, and many forms of, what are now called, vice seem to have been not only tolerated, but encouraged, for one or the other god or goddess sanctified as being its particular worship, the satisfaction of nearly every human craving, provided that this was done in accordance with prescribed religious formulæ. Any individual who was of a more severely moral turn of mind than his neighbours might feel with regard to these matters as we may feel with regard to some state regulations, that these worshippings were immoral, but all the same, his reason would have to guide his instincts amongst these complications.

These complicated customs and laws around the Mediterranean grew and grew until Germany and Scandinavia poured out their hordes over Europe and North Africa. With them the handfasting system was the only form of marriage. It was not necessarily associated with ceremonies, and dates were of no consequence because it was the custom for a father to recognise his children no matter whether he lived with the mother as his wife or not. As in the Greek language the Germans use the same word for expressing woman and wife.

This form of marriage is practically that of Scotland, where, although marriages to be effective must now be registered, this can if necessary be done in a police court. To this day prenuptial children can be made legitimate

by the declaration of the parents before witnesses that they consider themselves husband and wife, and in all the three Scandinavian States there is no serious obstacle in the way of men and women changing either wives or husbands, divorces and re-marriages, even by the Church, being easier than in some States of America. A curious case, indicating the survival of a primitive, and, one may safely say, virtuous feeling with regard to this matter, was reported in the Danish papers about November, 1908. A rich but elderly brewer with a grown up family married a young lady. Both soon discovered that they were unsuited to each other, and having decided to separate, a divorce was easily obtained. Then, much to the general amusement, the old brewer addressed a printed circular to all mutual friends and acquaintances giving the above simple reason for the divorce, stating that he had provided his former wife with a large fortune, which he named, and hoping that she would soon find a husband of suitable age! Conjugal fidelity in countries where unsuitable marriages can be re-adjusted is clearly much easier of attainment than with us, but each country decides for itself whether virtue shall or shall not be made easy.

Such indications that the old Germanic views about marriage still exist in those countries which have been least affected by French, Roman, and Oriental conditions, must not be overlooked, for they help to explain why in modern times a strong current has again set in amongst Germanic nations to revert to the more primitive conditions under which women insisted on making real marriage choices. It may here be pointed out, though the subject will have to be referred to again, that there seems to be a very clearly defined difference between the views which Oriental and European women have always taken of the marriage question. The Oriental woman is essentially the property and often the slave of her husband and is referred to in the ten commandments together with such other property as houses, slaves, oxen, asses, and

other items. The ancient Germanic wife was certainly not the husband's property and seems generally to have had the liberty of leaving him. This explains why amongst Orientals, adultery, the taking of another man's wife, is treated as a crime against the property idea and punished as severely as Europeans used to punish other forms of robbery, stealing, and poaching, whereas no truly Germanic State has ever looked on adultery as a criminal offence, in spite too of the very serious efforts which the Church once made to enforce its interpretation of the Decalogue, and of the modern doctrine that it was addressed not only to men but also to women. It must never be forgotten that Jewish and Mohammedan women have officially no souls and that it is only since the Council of Nicæa in 325 that female Christian souls are officially recognised.

English lawyers even more so than our legislators have created such a glorious confusion around the marriage question that their average fees alone approach to close on £100 for each case. It appears that the Church, by means to which reference will shortly be made, made marriages indissoluble. Then Parliament decided to pass private acts of divorce. Subsequently an act was passed empowering judges to grant divorces based on these precedents, and on certain pious opinions expressed by the Church. Modern divorce judges take the view that divorces are civil proceedings and also that the wife is the husband's property, and therefore always charge the jury that, in assessing damages, they shall under no conditions be guided by a desire to punish the co-respondent, but shall merely assess in pounds, shillings, and pence, the value of a wife. They do, however, allow counsel to use the unjustifiable word "criminal intercourse" instead of "adultery" and thus help to confuse the minds of juries before making their conventional statement. The State, in the person of the King's proctor, takes the Eastern view, that adultery is a crime; in his eyes if both parties

are culpable, they have to be punished by continuing to live in each other's uncongenial company, they have to be similarly punished if collusion to defeat the ends of justice be proved, and a mutual wish to separate, because it cannot by any possible means be strained to appear to be a crime, is not allowed to be brought into Court. The State may reasonably be looked upon as wishing to rear many and good citizens, yet it forces together people who are uncongenial to each other and whose children are therefore likely to be less perfect than they would otherwise be, and it places these children in an atmosphere of jealousy, lying, and hate and thus rears them to be bad citizens.

Then also there is probably no more complicated marriage system than the English to be found on the face of the earth, whereas across the Border nothing is simpler than the Scottish system. Reason has created these wonderful edifices of civilisation, and reason has to guide the instinct amongst them. If two people are drawn together, reason has to tell them that on one side of the Border they will be considered married if they live together, and on the other side that they are not married unless they have the banns published, unless they sign a very incomprehensible marriage contract and unless this is done in the presence of certain persons appointed by the State. Any omission invalidates the marriage and makes the resulting children permanently illegitimate, whereas on the other side of the Border marriages are made easy and illegitimate children can be made legitimate by subsequent declaration. No wonder that the intellect of the individual is unable in many cases to guide the instinct correctly, with the result that many marriages, homes, and families are thoroughly miserable and in no sense a credit to the State.

Reverting to the broader question of Urbanism with its property and marriage regulations, a correct understanding can best be obtained by reviewing the process

which has built up our modern civilisation. The task is an easier one than tracing the similar Mediterranean civilisation, because practically a new start was made when the Dark Ages set in, in which primitive rural conditions once more supervened.

Rome by its State trading had driven money out of Europe and had thus not only destroyed the standard by which property could be measured but had also destroyed this means of exchange, so that with the fall of Rome her once mighty property idea had dwindled to very small dimensions and approached very nearly to that of the barbarian Germans who had by then overrun not only the whole of Europe but also North Africa. While living in Scandinavia and North Germany these people are believed to have been fairly peaceful agriculturists, and to have evolved property ideas, but during the centuries in which they wandered about, living on what they could find, even these traces of civilisation had vanished. With these tribes the idea of property did not attach to land. The land was merely a highway free to all, or at least, to the strongest, who might roam about with the same liberty as ships and fleets now roam about the oceans. If these tribes found food and congenial shelter in one district they took it with the same feelings which probably possess fishermen who sail to the various submerged banks to catch fish. Then, too, the Germans were very hospitable, which shows that to them even food was not of the nature of property, it grew and had to be gathered or it had to be killed and it would be a matter of chance whether this was done by one person or another. The red Indians of America were equally hospitable, a pot being always on the boil for a visitor. The Germans unquestionably loved sport and objected to poaching, but chiefly perhaps because it reduced their chance of a pleasurable excitement. The only real property of an ancient German was his tent or hut, his sword, spear, and shield and perhaps a horse and dog. There was no other

property, women being almost independent. There is certainly not a single mention of a man's wife being inherited by his son, whereas according to biblical and other Eastern records, this was a common practice in the Orient.

The old Roman idea was that only freemen could carry arms, but, with the advent of the Germans, the privilege of fighting devolved on them and thus, during the Dark Ages, and during the very gradual growth of the property idea, together with the slow rise of industry and trade, a differentiation set in which resulted in the creation of Ruralism, Urbanism and Militarism. Peace loving towns people then found themselves surrounded not only by a food producing rural element but a wasteful and aggressive crowd of robber knights, who to a large extent dominated the tillers of the soil and both despised and depressed them as much as possible. The fairly manly and highly cultivated urban population thus found themselves opposed to two rural ones, of which one was weak in character and intellect and the other strong in character but savage. There was no law of the land, the knights had absolute power of life and death over their serfs, they had their respective Orders and would submit to no outside control, so that the only means by which the towns could maintain their independent positions was severe discipline amongst themselves and exclusiveness against others. The harsh spirit which was thus evolved, and which in England finally adopted the name of Puritanism, is essentially Urbanism, and now that Feudalism is dead, it still stands in severe contrast to the old nobility, with its memory of ancient customs. When laws were enacted for entire States, towns grew less exclusive, the agriculturists were drawn into the towns and effected a curious change. Having like the town's people been oppressed by the nobility, they imagined themselves to be in harmony with these, but remained rural in spirit, so that one may say of the present large

populations of towns, that they are rural in most of their tendencies and combine all the vices of the town and country, for internal discipline, the essence of the old town's life, has ceased, due to rural influx or is only slowly growing again in the form of trades unionism. The nobles, who, like the peasants, have existed for ages in the country, also possessed rural and ancient notions, after migrating into towns they have assimilated many of the disciplinary institutions, without shaking off old tendencies, thus creating artificial boundaries between classes. The exclusive harsh Urbanism of the Middle Ages which was mainly directed against outsiders does not now exist but much intolerance of a general kind remains.

Puritanism is generally looked upon as a religious movement, but when one remembers that it is the child of Urbanism, born in a period when persecution was the order of the day, it is not surprising that it has always had a tendency towards atheism, and now that it has been joined by the industrial populations, which, as already explained are of rural origin, it is not surprising that the bulk of the working classes are distinctly irreligious.

Urbanism, during its conflict with ruralism and militarism was constantly hampered by the Church of Rome, and unlike the Greek towns in which religion was elevated, European towns readily led the attack against what was felt to be a disturbing element. It is but natural that a community which elaborates laws about property should object, even if only vaguely, to an institution which is based on the principle that faith in one miracle will wash out all sins. Priestly dispensations for theft, robbery, and murder, if they could not be ignored by towns' magistrates, must have been most disturbing factors in the severely orderly town governments of the Middle Ages. An indication of this trouble is afforded by a Hamburg Resolution of the 13th Century to ban any Priest who appealed to Ecclesiastical Courts.

No wonder then, that when in England Urbanism in

the form of Puritanism gained a free hand, opposition to the Romish Church should develop into atheism. Milton, the most brilliant exponent of Puritanism, was, as his posthumous works show, a confirmed atheist. His "Paradise Lost" is probably the severest blow which he could, under the then existing conditions, deliver against the prevailing belief. Satan, the creation of the Dark Ages, and especially of the Thirty Years' War, was by him raised to the position of a deity, and the popular notion of Christianity is now probably not far removed from that which the ancients had of their Pantheistic systems. A simple creator has been replaced, by two powerful beings whose struggles, like the struggles of the Greek gods, the patrons of Greece and Troy, are to be fought out by humanity. Individuals are supposed to be partisans of the Trinity, or of Satan, and fear of the latter power is evidently intense amongst the majority of mankind.

It will now be necessary to examine as briefly as possible, how the modern marriage has grown out of the old Germanic hand-fasting system. Those barbarians of ancient days who admired Rome, will have copied its institutions, even after its fall, and our word "gentleman" testifies that in England at least, there must have been a tendency for the leading families to adopt marriage regulations similar to those of the Roman *gens* or patrician families, and similar tendencies no doubt prevailed throughout Europe, but in the days of Charlemagne the essentials of the Roman marriage had been forgotten. He married Hildegard, the daughter of a noble Suabian, and recognised her as his equal by making her his queen, but some time after, not only were her three sons crowned during Charlemagne's lifetime, but an elder son, Pepin, whose mother was not a queen, was also crowned king. According to Roman law, only the sons of Hildegard could inherit the father's reigning privileges, but Charlemagne merely treated Hildegard as his queen, and made no distinction with regard to his sons, the German custom

being that a man's property should be divided equally amongst his sons, no matter who the mother might be, and Charlemagne looked on the Empire as his property. Doubtless his contemporaries would have been surprised and shocked if he had differentiated between his various lots of children. It appears that he had seventeen, of whom only nine were born by queens, but he kept all at his court and treated them as equals. In order to understand this condition of things, it must be remembered that the modern practice of disowning illegitimate offspring and disinheriting even one's legitimate children, was unknown in those days, for even as late as 1452 Piero acknowledged Leonardo da Vinci as his son and brought him up in the company of his legitimate children.

The same views or customs which prompted Charlemagne to call Hildegard his queen while apparently not considering Pepin's mother to be sufficiently high born for that rank, led him to refuse his sanction for the marriage of his favourite daughter Bertha with Angilbert, court poet, and secretary to the Emperor. Yet he had no objection to their living together; at any rate Bertha had two sons by Angilbert, who was publicly regarded as her lover. Then, also, Charlemagne's eldest daughter, Luitgard, by Hruodrud, his third wife, was never married, but had a son who was favoured by her father. He evidently must have thought that the marriage between equals, as between members of the different *gens* of Rome was something superior to the German hand-fasting marriages and more of the nature of an alliance between two families, but he had no hesitation in reverting to the Germanic customs when he wished to change one wife for another, and his doings in this respect must here be referred to, as they explain how the Roman Catholic Church marriage customs were established.

Charlemagne had for his first queen Hildegard, the daughter of a Suabian chief. His brother had for wife a

daughter of Desiderius, King of the Lombards, who was one of the greatest powers south of the Alps. Charlemagne was induced to part with Hildegard, and married, it is believed in the presence of the Pope or of his representative, Desiderata, also a daughter of Desiderius. The King of the Lombards finding himself allied to both North European powers, commenced to dictate to the Pope, who, having grown fully alive to the danger of being reduced to the position of a mere servant, implored Charlemagne to put away Desiderata and come to his assistance against her father. This he did. He took back Hildegard, with whom he had lived before, and his brother having died, he joined the German kingdom to his own and then absorbed Lombardy.

Long after his death the Empire was divided amongst his three grandsons, Lothair (Hlothar) King of Italy and Lotharingia and crowned Emperor, Charles (Karl) King of France, and Louis I (Hludwig) King of Germany. Lothair died in 855 and his son, Louis II, was crowned Emperor and King of Lotharingia. His brother, Lothair II, was King of North Italy. During the father's reign, the latter had married Waldrada, or rather she arrived at Court with the customary marriage dower and the two lived there as husband and wife. They were treated as such, and their son Hugo seems to have been looked upon not only as heir to the Kingdom, but also as heir to the Imperial Crown, for the elder brother, Louis II, had no children. After the death of the Emperor Lothair I an Abbot, Hukbert by name, induced King Lothair II to put away Waldrada, and marry his own sister Teutberga. Both she and her brother, however, proved to be veritable fiends, and Lothair II naturally wished to get rid of her as his great grandfather had got rid of Desiderata. Having however been brought up in the Court of his grandfather, Louis the Pious, it was but natural that he should consult his clergy. They decided on the 29th of April, 862, that he might put away his second wife. This

did not suit his two uncles who were hankering after the Imperial Crown, and they insisted that as the Imperial Crown of France, Germany, and Italy might fall to Hugo, the clergy of the three kingdoms, and not of one only, should be consulted. The Pope agreed, and sent Legates to this second synod which in June, 863, once more affirmed that Teutberga might be put away and Waldrada taken back. They claimed the right " to bind and loosen on earth."

Niklaus I, famous on account of the forged Isidorian credentials, was Pope. He had just refused to agree to a decision of a synod at Constantinople, could he agree to a decision of a Council of his own clergy, who had not even consulted him as to theirs? Not he! His reply was to disgrace his Legates and to insist, in opposition to them, that " What God hath joined together, man shall not put asunder," and as Lothair II had been joined to Teutberga by the Church, *i.e.*, by her brother Abbot Hukbert, who was present at the ceremony, this marriage was by the Pope declared indissoluble, a decision which is opposed both to Germanic and Hebrew custom. The King's brother, the Emperor Louis II, was furious, he went to Rome with an army, and apparently made the Pope see that this policy, if applied all round, would not be to his advantage, but Niklaus died in 867. Hadrian II, his successor, was very favourably inclined towards Hugo. He removed the bull against his mother Waldrada, the first wife of Lothair II, and was paving the way for her recognition as queen when both he and Lothair II died about the same time in 869. Young Hugo, who is not mentioned again, would have been no match for his two powerful uncles, of whom one took the Imperial Crown, and the other took Lotharingia. This event decided, for the next thousand years, that the inheritance of reigning privileges, such as kingships, should descend only to the children of marriages sanctioned by the Church of Rome, though, as is well known even in our history, this ecclesiastical law was not always enforced.

Property hardly existed in the modern sense of the word, but gradually as the idea grew, the Church view of legitimacy and inheritance was extended so as to include property, though not in England where to this day the law of inheritance of real estate is that based on the Pope's decision about inheritance of reigning privileges, while personal estate can, in conformity with the ancient Germanic custom be left to legitimate children, or to strangers, the latter including illegitimate children. In consequence of the drastic change brought about by Niklaus I, which at first affected only the ruling classes, the sacramental nature of the Church marriage had finally to be insisted on so as to differentiate it from the customary hand-fasting and other prevalent marriage customs, but that is a post Reformation innovation, for the weddings in the early Church marriage registers of the 16th century, merely record that the parties have presented themselves as being man and wife.

Although the doctrine of the indissolubility of the Church marriages is claimed to be the corner stone of modern civilisation, it made but relatively slow progress, and has, in a sense, been completed only to-day, when most nations have already repudiated the idea; for it is only now that the Church of Rome has taken the logical step of refusing to recognise civil marriages as having the same sacramental value as Church marriages. In the past ages the Church formula as regards commoners merely meant that "What has been joined by law or custom, not even the Church can dissolve," for according to the view of the old Catholic Church and according to that of the Church of England, even hand-fasting marriages, as exemplified by Scotch customs, were and are as binding in the eyes of the Church as are marriages which had or have been celebrated by it. On this point the Roman view has now changed, with what object, and with what future consequences, it is difficult to say.

It is claimed that the Church view about marriages has

given European women their present independent and high position. This is unquestionably true, but is it not also possible that European women have attained this position because they are more independent, more high minded, and less passionate than their Oriental sisters? Did not European women have a high position in Greece and Rome? and did they not join in the Councils of the ancient Germans and even fight in their battles? It seems more likely that during the long period when the natural quarrelsome tendency of the Germanic races had full play, women stepped for a time into the background, out of which they emerged as soon as comparative peace and security had been restored.

This brief review of modern Urbanism would be incomplete without some reference to a factor which seems to have had a powerful influence on Puritanism. During the Reformation period, practically all the doctrines of the Middle Ages had got loosened, as if the whole system of the then existing civilisation had been shaken out, like a crumpled cloth, and reformers were only too anxious that it should not be folded back again into the old pleats. Any doctrine, as long as it was opposed to the old ones, was welcomed, and Luther even sanctioned polygamy. It was therefore but natural that people should seek for information wherever they could, and they naturally turned to the Bible which, due to the inventions of paper and of printing, had then for the first time been made generally accessible. The various reformers were obviously desirous, not only to obtain biblical authority for their teachings, but also to make proselytes, and in their translations of the Bible they were guided by the principle, so naïvely put in the instructions to the English revisors of 1604 that they should follow the then existing translations as closely as truth would permit, that the names in the Bible as vulgarly used should be retained, and that when a word was found with several meanings, that agreeing with the faith should be used. What else

can be expected than that the several translations of the Bible should breathe the spirit of the respective reformers, and that each translation is quite uniform in language, whereby the fact is glossed over that the Bible is a compilation and that even the six books of Moses and Joshua are from different sources and of comparatively recent compilation. There could, for instance, be no excuse, except a fear that a particular view would thereby be shaken, for translating the names Jehovah and Elohim indifferently by the words God and Lord, for using the single word marriage where Paul uses two distinct expressions, and for impartially translating Hades thirty-two times by the word Grave and thirty-two times by the word Hell. An absolutely literal translation, in which single modern words would not be used for two diverse ancient varying ones, might even yet be profitably undertaken and would long ago have started critical enquiries which the orthodox Churches now seem to encourage. Had this been done earlier by a real searcher after the truth, the result might possibly have been a shaking of the faith in the Bible and strengthening tradition as a whole, but it is more likely that it would merely have had the effect of weakening the doctrinal value of the Old Testament, with its merciless injunctions and doubtful interpretations of the New Testament. The way would thus have been paved for that religious toleration which is still to be wished for. To-day the mutual antagonism between opposing churches can hardly be said to be as strong as between sub-divisions of believers in the same great doctrines of which one portion, chiefly the urban populations, clings to the severities of the Old Testament, while the other portion, chiefly rural, is more inclined to rely on the promised forgiveness of the New Testament. Here, as in so many other cases, it is the community which chooses its belief, and not the teaching which influences the community.

A mere cursory glance at the social conditions which had come into existence at the end of the Dark Ages

reveals that in spite of the Church's teaching of the sacramental nature of marriage, and in spite of the doctrine about the deadly sinfulness of sexual love, a laxity had crept into the morals of Europeans which rivalled that of the ancient Greeks and the latter day Romans. The indissolubility of marriages, which were soon looked upon as being merely of the nature of alliances, coupled with the independent spirit of Germanic women, which has always rebelled against their being permanently tied to uncongenial partners, and especially against all attempts to force them into seclusion and out of society, to which their Oriental sisters have readily submitted, were no doubt the prime causes for the then prevailing condition of things, of which Boccacio's "Decameron," "The Heptameron of the Queen of Navarre," "The History of the Troubadours," and many historical events, give a picture which does not seem to be at all overdrawn. This was the condition of things, both in the country and in the towns, but in the latter Urbanism had of course been busy framing rules, and had acted under the same impulse as that which prompted the ancient Greek and Roman citizen, namely that of trying to maintain the purity of the race of patricians. The temptations to which their wives would be exposed if subjected to the courtship of travellers and bachelors was materially reduced by re-erecting, as it were, temples of Venus in the shape of houses of pleasure, and by regulating the trade; an Act of Parliament of Edward III even fixing for the whole kingdom the services for which these females could demand payments. It is therefore not surprising to find the Lord Mayor of London, the personification of Urbanism, on the occasion of Jack Cade's Riots, being mentioned as owning sixteen houses of pleasure. Doubtless, as is still the case in some continental towns, and in Japan, these houses were looked upon as moralising factors, and it is abundantly clear that Urbanism readily accepted them either as being no evil or the lesser one of two. Even compara-

tively recently in one great continental state, the question of re-instituting regulated houses of pleasure, so as to protect married women from the temptations to which they were considered to offer too little resistance, has been seriously considered.

This condition of affairs which might have led to a social system similar to that of the Greek towns, was changed at the time of the Reformation, though neither by the reformers nor by the urban powers. A far more potent factor than mere preaching was at work in the shape of a microbe which made its appearance almost immediately after the discovery of America and which was being spread all over Europe with incredible rapidity through the instrumentality, so it was believed, of houses of pleasure. Whereas even in 1449 the Lord Mayor of London owned sixteen of these houses, Henry VIII. passed a law which was intended to wipe them out. This veritable pestilence, for at first it was incurable, was mainly instrumental in resuscitating the almost defunct doctrine about the deadly sinfulness of sexual love, and as townspeople, on account of the above-mentioned institutions, suffered more severely than country people, the doctrine about the sinfulness of love was greedily absorbed by Urbanism, and now amongst the elders of middle classes, it seems to be treated as an article of faith. Those who persuade themselves that they have not sinned, or those who by secret repentance in their old age consider themselves ordained to decide what is right and wrong in this matter, will doubtless say that this dogma is the right one, and that it should by all means possible be drilled into the younger members of the state and especially into what they look upon as the depraved rural element which predominates in the upper and in the working classes; but in these pages questions of right and wrong cannot be decided, and this subject together with many others has only been mentioned in order to show what a difficult, not to say hopeless task confronts the individual

intellect whenever it has to guide sexual instinct amongst a most intricate labyrinth of edifices of civilisation. The state, however, refuses to have anything to do with the above mentioned doctrine; it wants to have many healthy and intelligent children. It now registers marriages, but only after the property idea has been established on a firm basis, though by the time that that was done the Church had upset the ancient Germanic institutions, according to which a father had to provide for all his children alike. The sum total of the complexity is now that a father can be forced by law to provide for illegitimate children, but may disinherit his legitimate ones, unless he dies possessed of entailed property, which descends only to his eldest son. The next complexity is that after the introduction of the dogma of the indissolubility of marriages, the Catholic Church practically dropped the dogmas of the deadly sinfulness of sexual love, readily absolving even adulterers, and with them the original Christian dogma has gradually been overshadowed by the more primitive one, that salvation can be attained without overmuch faith, by good acts and by repentance. This latter tendency has been strongly supported by all European states whose laws refuse to recognise either faith or repentance, but insist on good acts, and one and all they refuse to treat sexual love as being a deadly sin, even when indulged in by adulterers. Even the state activity is not free from complication, for on the one hand it would gladly reduce the number of bachelors so as to give husbands to a large number of girls who would make excellent mothers, and at the same time state institutions flourish which tempt girls away from their homes into offices and punish them with the loss of their livelihood if they should marry. To add to the confusion, certain classes of society have adopted those harsh puritanical views on this matter which are diametrically opposed to the leading state idea and to the natural tendency of Germanic races. The whole subject has thus attained a high state of most unnatural artificiality.

SEXUAL ETHICS.

THE previous chapter on Ethics may have appeared somewhat laboured, for it is only by a stretch of the imagination that the term immorality can be attached to the intensification of some of the milder instincts, but with the sexual instinct there is no uncertainty, for it is most readily associated in the popular mind with both immorality and crime, yet the enquiry is none the less a complex one even if for no other reason than that it has been hedged around with innumerable complications of which one important one, Christian marriage, has been discusssed in the last chapter. There are, however, other complications which have to be referred to before the question of immorality can be gone into, for it has first to be shown not only that sexual love is as natural an instinct as any other, but also that the majority of mankind hold this view, in spite of the fact that the Christian religion is founded on the doctrine, referred to in the chapter on "Ideas and Idols," that sin came into the world through the parents and death through sin. In other words the philosopher who in past ages may have wished to impress his hearers with the belief that everything which has had a beginning must necessarily have an end, was sufficiently far advanced in his knowledge to place the beginning of a human life not at the date of birth but at the date of conception. Salvation from this idea could only be attained by an understanding or a faith that life is everlasting, and that birth or conception and death are but changes from one form of life into another, just as the life energy of a pendulum is changed with every swing from potential into kinetic energy, and at one instant finds itself existing in time and then out of it and therefore in eternity.

It cannot be said that the average Christian is very conscious of the fundamental doctrine of his religion, but as the doctrine exists and as it can always be advanced as an argument against the view here advocated with reference to the interaction of reason and instincts, it will have to be shown, if this be possible, that the majority of mankind of all ages, and even thoughtless Christians, have looked on sexual love as being something natural and in itself, neither immoral nor criminal.

In reviewing the past one cannot, of course, go back to the dawn of civilisation, for its institutions were already advanced when the art of writing was invented, say 3,000 or 4,000 B.C., and earlier legends are too vague to be of value, nor is it easy to thoroughly understand early records, disputes about the meanings even of biblical expressions which have of late attracted much attention, indicating that also in this case everything is not clearly understood. It is found, however, that even amongst the Buddhists with their teachings about the ethical advantages of celibacy, sexual love is never branded as being a sin, though of course adultery and other transgressions against the property idea are severely punished.

Turning to the Greeks one finds that their customs were as numerous as their communities or states, but generally speaking, the legends of the lives of the Olympic gods and goddesses, not only suggest no idea of immorality in sexual love, but encourage its being carried to excess. Venus cults, which like all worshipping consisted in doing what was pleasing to a deity, though originating no doubt in a worship of agricultural fruitfulness and plenty, evidently at once degenerated into the extreme opposite of fruitless harlotry, when carried into towns, for economic considerations and fear of overcrowding of fortified Greek towns tended to encourage almost any practice which would keep down the numbers of the population; yet it strikes one as being strange that the Greeks with their love of philosophy and argument should have allowed

such glaring anachronisms as the following to be perpetuated in their midst. A man was expected to have a family, as without one he could not claim even those marks of respect from young men which they were compelled to render to fathers of families. Children were therefore frequently adopted. Then, too, girls who had not married at a certain age had to suffer punishments; in Ephesus this took the form of their having to prostitute themselves at the temple of Diana to the male public. Men without families who might be considered physically weak were strongly enjoined by various leading Greek statesmen: Solon, Lycurgus, Plato, and others, to invite vigorous young freemen to their wives' beds. Yet with these encouragements towards early marriages and the procreation of vigorous and large families, all Greek states either permitted or compelled infanticide, and they rigorously excluded all those people from amongst themselves whose fathers and mothers were not true citizens. No wonder that in these states the sexual instinct, patronised as it was by Diana of Ephesus and Venus Aphrodite, and at an earlier age by Istar and by Sirima Devata, and now by Kali in India, should become exaggerated beyond its natural sphere and should degenerate into unnatural excesses of the one-sided imperfect instinct, which inhabitants of the temperate zone treat as felonies but which Diogenes and Nero practised in public. Unfortunately for civilisation, these excesses emanated from a land full of philosophers and poets, and the classic scholar who drinks the nectar of their speculations can hardly escape the dregs of ancient immorality. Judged even by oriental standards, the Greeks were a very immoral people, and wherever the Greek teachings have spread, formerly to Rome and now through Mohammedan agencies to Africa and Asia, there incalculable harm is being done by unnatural sexual abominations.

Rome presents another picture. Its decline and fall were in part due to the dying out of the real Romans,

brought about perhaps by the introduction under Nero of the Greek substitutes for the true sexual instinct, but in the early days of this marvellous empire, a high tone of morality is found, and yet no suggestion that the sexual instinct is an immoral one. Restrictions about citizenship were similar to those of the Greek towns, but infanticide does not seem to have been tolerated.

The Roman marriage laws have already been mentioned, and that one which applied to the lower classes, amongst whom the mere living together for a full twelve months constituted marriage, indicates that the Romans did not look on sexual love as being a deadly sin.

Turning to the Orient, one finds that in Bengal half the population are believers in the goddess Kali or Vishnu and her consort Siva, and they indulge in a worship which resembles the Venus worship of the Greeks and consists in those rites which the goddess is supposed to like best. Then, too, the male members of the upper castes are treated to the most intimate hospitality of the wives of members of lower castes, and the word adultery amongst these people probably applies, as in ancient Rome and amongst the Jews, only to those cases where a low caste male receives the same intimate hospitality from a high caste lady.

In China, where classical culture existed long before the foundation of the Roman Empire, it is difficult, if not impossible, according to statements by European missionaries and travellers, to make the natives grasp the Christian teaching about the sinfulness of sexual love. To them love is merely an instinctive act like breathing, sleeping, eating, drinking, etc. In their eyes, as in ours, it is not a sin to eat when hungry, but it is a sin against the property idea to steal food or anything else. To them sexual love is no sin, but it is a sin against their strongly ingrained idea about a wife and daughter being the property of a husband or father to rob him of either, and Chinese punishments for these offences are quite as severe

as ours used to be for poaching and stealing. These views are shared by practically all Asiatic people.

Japan is of interest because it is a country in which a state of civilisation has been reached which, by some travellers, is declared to be superior to that of Europe, a view which is perhaps not shared by the Japanese, for they seem only too anxious to copy European institutions, and they almost naturally do not at present boast about their own. It is therefore difficult to get at the soul, as it were of this people, especially as regards their views on the sexual question, and Europeans who have lived in Japan, even if they have associated intimately with the natives, always confess to a feeling of not knowing all, and not being able to grasp fully the sexual part of the basis on which that civilisation rests; but the following summary, wanting though it is in many respects, may be considered as giving a fairly correct idea as to what has been learnt of Japanese views on this matter.

Children in Japan are as a rule not a burden to their parents, not even in towns; daughters are as good as capital and can at any time be sold, and boys are still more highly prized. Unless a girl be married, her children are the property of her father or guardian, and therefore it is not a disadvantage for a girl to become a mother and she is not ashamed of having children. Betrothals between children are it seems contracted by parents in compliance with a religious command, and when these reach the requisite age they are married, or rather they become man and wife, the ceremony consisting in an exchange and drinking of cups of saki. If later on the wife does not please her husband, if she bears him no children, or only girls, or for any or no cause, he can, if he likes and without any legal pronouncement divorce her by paying her a definite sum of money and telling her to go. So little is thought of these divorces that not infrequently a divorced wife remains in her late husband's house as his servant, even after he has taken another wife.

To us this sounds almost like an impossibility but in Japan the social position of women is an exceptionally low one, so much so that the men of the lower classes talk of their women as being of less account than "yellow dogs." The difference therefore between a Japanese wife and a servant is not a great one. In the same way as amongst the lower classes of ancient Rome, women had a more independent position if they were not legally married to the men with whom they lived, so it would appear that amongst the lower classes of Japan a woman's lot is not necessarily made worse by her changing from the position of wife to servant.

As far as can be gathered from people who have lived in Japan and who have enjoyed the friendship of what one would call the upper middle classes, though in Japan merchants have no high social position, it would appear that amongst them divorces are nominally as easily carried out as amongst the poor, but in practice, pressure from the wife's father, if he be rich, interposes considerable difficulties. It is the same with regard to the sale of daughters. If the father be rich his daughters will most probably be betrothed early and marry, but if he should lose his money in an unfortunate speculation, his first thought would be to sell his unmarried daughters to some private man, or to a public house of pleasure. These girls would of course be more highly educated and more refined than the low, and would command a much higher price than those usually met with. Thus, also in Japan, sexual love is clearly not looked upon as being a deadly sin.

The Ethiopian races have little feeling for the European and Asiatic property idea, and though they own wives, they do not trouble to seclude them as is done by the Semitic and Indian people, and under these circumstances and knowing their own lax views, or rather the absence of controlling influences with regard to sexual matters, many tribes refuse to admit that the children of their queens are necessarily also the children of their rulers,

and with them the reigning functions descend from the uncle through one of his sisters to a nephew. There is at least this certainty with regard to the successor that he is the son of a Royal Princess. Of the Ethiopians it may, in fact, be said not only do they see nothing sinful in sexual love, but even the fearful tortures associated with lynching as practised in America, do not deter them from violating unprotected women, and they thus constitute a most serious danger to the white female population of the South.

Turning to more modern conditions, it will be noticed that, however much novelists may attribute bourgeois codes to the peasantry, however much morality preachers may brand practices as immoral, the peasantry of every country sees nothing sinful in cohabiting before marriage, and a comparatively short sojourn amongst farm labourers, or in secluded villages, or in the highlands of any country, will reveal that the rural wives and husbands have selected each other after trial. This is the ancient Germanic hand-fasting custom. In some districts it is rare for girls to marry who are not already mothers, and the latest Parliamentary enquiry into Crofter troubles proves that this practice is still the most usual one. Clearly, therefore, the country people do not even yet look upon eating of the fruit of the tree of life as being a sin, and seeing that children are of value in the country, a man there almost naturally selects for a wife a girl who has shown that she can bear them.

In some districts, more especially in the highlands, a bizarre civilising influence has produced a change. The ancient well established system of Germanic hand-fasting has given way to "bundling" or "tarrying" as it is now called in America. This is a form of courtship, which took place between Siegfried and Brunhilda. It does not seem to have been frequently mentioned by writers, but some almost extinct rites in noble families, according to which formal betrothals have to be solemnised on

couches, suggest that a view did formerly prevail that, in order to ensure happy marriages, troths ought to be plighted in bed. In those country districts where bundling is the recognised rural custom, the parents of a marriageable girl allow her to invite bachelor friends one after another to share her bed for a night. This is generally situated in the same room as that of the parents, probably the only one in the hut. In those highlands where the daughters live alone during the summer months tending the cattle on the hills, this form of courtship in bed, if practised, is done without parental supervision, but is generally equally conventional. These customs are departures from the ancient Germanic hand-fasting system, due no doubt to Church influences, just as the more stilted official betrothals of the Spanish and French aristocracy are due to the expansion of the property idea.

Nowadays, the age of Louis XIV. is looked upon as having been an immoral one, possibly because the princes of those days with the king at their head, displayed their mistresses in public. The same view or a similar one was held by the already powerful urban populations of France, who under the name of St. Croix—similar to the English Puritans of the same period—were intent on crushing most country practices, including sexual ones, and substituting rigorous and artificial town codes. But that the upper classes, with the solitary exception of the Amazon Princess of Orleans, known as La Grande Mademoiselle, saw nothing immoral in these practices, is as good as proved by the tendency amongst them to give their daughters the refined education which would enable them to influence the men, who it was hoped, would one day keep them. Let us enquire of the highest noble of France, le Grand Condé, Master of Burgundy, Berry and Lorraine, with Champagne and Normandy held by brothers. He is found showering honours on Prince Marsillac, who professedly had for mistress Condé's only sister. He also gave his consent, subsequently withdrawn

for political reasons, to the marriage of his younger brother with the mistress of M. de Retz, who was a daughter of the Duchess de Chevreuse. Clearly in the eyes of the nobility of those days, marriages, as amongst the Roman Patricians, were merely alliances, and sexual intercourse amongst members of a caste cannot have been considered immoral. In those days it was respectable to have a mistress or several, as it still is to have one in Belgium, and as it is respectable and stylish in oriental countries to be able to boast of a large Harem.

Did these practices, immoral though they may appear in puritan eyes, really outrage the feelings of the people amongst whom they existed? The answer is distinctly No! When one remembers that Louis XIV. was the first European prince who conceived and carried out the idea of providing furniture and food for his guests, and that before his time social intercourse amongst the nobility was fearfully hampered by bad roads and by the necessity of taking their household goods with them whenever they visited each other, it seems but natural that their forced seclusion in the country and their primitive lives would perpetuate in them those Germanic views about sexual intercourse which had existed in the rural populations both high and low since time immemorial.

When Louis XIV, by means of state pensions, increased hospitality, and even by his dancing in public, attracted the nobility into Paris, their rural sexual practices would appear highly immoral in comparison with the puritanical codes which had by that time developed amongst the industrial inhabitants of towns. A long sustained attack was made on what the old inhabitants looked upon as immoralities imported from the country but what the nobility thought to be a natural life. In France, the King's influence was too great and the very artificial system of town gilt rural customs which may be termed the French social code gradually established itself and spread all over Europe.

A strange complication had been introduced when Christians met Mohammedans during the Crusades. Before that time very little if any importance attached to the virginity of brides, in fact, the very prevalent hand-fasting marriages show that the procreation of a large family—especially of boys, and not any views about so called purity of virgins was one of the reasoned considerations on which marriages were based amongst the ancient North European tribes. The high praise which the Romans bestowed on the chastity of German wives was probably not misplaced, for having selected each other after trial, married couples would find little cause for disagreement and, if they did, would be blamed as stupid, fickle, etc. It was not until after the days of Charlemagne that the teachings of the Christian faith which then existed only in the Balkans, Northern Italy and in France, made any serious progress in other parts of Europe, and our ancestors being accustomed to worship not only male but female gods, retained a craving for a deified female. This accounts for the "Mother of God" being rapidly clothed in various divine attributes amongst which her continued virginity, as being the most mysterious, soon figured very prominently.

Then came the Crusades, in which Northern warriors were brought face to face with the ancient Semitic marriage customs. The public exhibitions at their marriages of signs of a bride's virginity, a practice which persists to this day, the right of a bridegroom to return a bride who was not a virgin and other indications as to the prime importance which is attached to this condition, together with the mysterious Christian dogma of the immaculate conception and the dogma of the deadly sinfulness of sexual love, must have engendered amongst the illiterate Germanic warriors a feeling that virginity was a holy condition. This view or something like it seems to have spread amongst the European nobility, notably in France, and the practice of keeping unmarried

girls away from the company of men made fairly rapid progress until gradually a belief in the holiness, purity and intrinsic value of virginity was erected, which is foreign alike to the views of the ancient Germans and to those of the Semitic nations. The latter do not prize virginity, for they destroy it ceremoniously before marriage; they merely look on it as a proof that the bride has been kept out of the intimate company of men; after marriage the husband will see to it that his wife shall still lead a solitary life. A different view is held in China, for there the virginal membrane of girls is destroyed soon after birth. Metchnikoff suggests that this is a local hygienic operation which reduces the chances of being afflicted with anæmia.

It is still necessary to deal briefly with some of the peculiarities of the sexual instinct, for it is an exceedingly complex one. As with all other instincts those individuals, in whom this one is most active, are unconscious of it unless they have the will and the intellectual ability to contemplate themselves from an outside point of view. No animal feeds on grass or stalks its prey because it knows itself to be possessed of the feeding instinct, and it is only because human beings can reason that they know that a certain undefinable feeling called hunger is one of the manifestations of that instinct. They know and can explain that food is required; an unthinking animal merely follows a feeling which prompts it to hunt and to eat. Love is said to be blind because those who feel its power deny its existence and cast about for any unreasonable explanation for their acts, just as a seasick person is almost sure to say that this condition was brought about, not by the sea, but by the smell of the dinner or engine room, or the looks or examples of fellow passengers. Similarly a couple who love each other will struggle manfully against every suggestion that they are manifestations for the time being of the sexual instinct, and their very natural anger at the mere suggestion of such a

motive is perhaps responsible for the unnatural modern tendency to extol sordid marriages. Lovers profess to adore and admire each other because of their perfections as regards beauty, gracefulness, manliness and character, attributes which have merely been invented by their two intellects in obedience to a feeling that reasonable beings should be able to adduce reasons for their likes and dislikes. Their friends and neighbours, who are not swayed by their mutual love instinct, see plainly that neither lover has any of the imagined qualities; both seem rather foolish; she is no Grecian beauty, hardly passable; he is not what one would call an ideal man, etc. It is the outsiders who have the privilege of noticing that the two admire each other in spite of, and not because of their qualities, and it is they to whom it is clear that it is the sexual instinct alone which draws the individuals to each other.

It is a matter of common experience that in countries where husbands and wives choose each other without outside assistance, incongruous marriages, more particularly in true love matches, are fairly frequent. Tall and short, handsome and ugly, wise and silly, miserly and extravagant, attract each other so powerfully that they enter into life-long marriage contracts in spite of warnings, protestations, and even threats, of friendly onlookers. It is generally supposed that in these cases the sexual instinct has exercised a discriminating power of which reason has no conception. This instinct is apparently one of the means employed by Evolution for the perfection of the human race. It may for instance be imagined that a very tall person is throughout life persuaded but by unconscious means that his tallness, coupled perhaps with an undersized heart and therefore a lackadaisical disposition, is a disadvantage in his walk of life. Similarly the small person may have an unconscious feeling that the superabundant energy of which he or she is probably possessed ought to have been housed in a larger frame.

Two such supplementary feelings lead in general to a mutual admiration of people for opposite extremes. It is not only the tall people of one sex who are fond of walking or dancing with small ones of the other sex, but extremes of the same sex both as regards stature, intellect and appearance are frequently intimate associates.

It is popularly supposed that when the discriminating power of the dormant sexual instinct in two individuals feels that the blending of many of their characteristics, or of their chief characteristics may result in a child which will be more perfectly adapted to its surroundings than either parent, then this sexual instinct makes itself felt as a very powerful mutual attraction, so powerful indeed in some cases that it does not hesitate to break through the most formidable barriers which civilisation has erected for its regulation; elopements, divorces and ruin of happy homes, and fortunes count as nothing in comparison with the aim which the mutual instinct is pursuing. It might therefore be expected, and it certainly is a popular view, that children which are the result of love matches, are better specimens of humanity than those whose parents have been joined together on carefully reasoned considerations. Even the Bible adduces Solomon as an encouraging example. The sexual instinct, therefore, appears to be a conscientious servant of Evolution, which assists not only in propagating the species, but also in modifying, equalising or perhaps improving it, whereas reason which thinks itself to be an important factor plays but a poor second fiddle in love affairs.

The instincts of women are admittedly stronger than those of men, and in love affairs they are more readily swayed by unreasoned or instinctive powers, and do not so frequently experience revulsion of feeling, but men, by relying too much on their reason even in love affairs, seem often to make wrong choices. In ancient Greece every opportunity was given for the instinct to assert itself. Young men and women were permitted to watch each

other indulging in races and games in a state of nature, and as the whole body of a person and his movements, and not only the face, express his true nature, the instincts of the Greeks had an excellent chance of making the best selection, and the result was certainly a set of fine though widely differing tribes—Athenian philosophers and Spartan gladiators. Those who doubt the expressiveness of the human form should take the not very great trouble of going to a swimming bath, and, standing behind the diving stage, compare the backs of the individual bathers. They will go away confessing that though they cannot read characters by looking at backs, because of their want of practice, they cannot doubt but that even with such a limited and fairly flat region as the human back, there are differences quite as great if not greater than those noticeable in faces. Contrasts between individuals would naturally appear more marked if not only the face but also the whole body were visible. In fact some people assert that although the brain is the seat of the intellect, its capabilities are less definitely expressed by the outward shape of its hard skull, than by other parts of the body, which like the skull, shape themselves during growth in harmony with the whole nervous system, including the brain. It is not the brain which takes its shape and structure from the skull, but the skull adapts itself to the brain and even shrinks in old age as the substances waste away. It is therefore not improbable that there is truth in the remark that an Ethiopian's weak legs as against the stout ones of the Caucasian are correlated to the respective brain capabilities. Likewise the slender neck of Apollo as against the stunted one of Hercules is indicative of their respective intellects. A perfect figure and naturally graceful movements reveal the naturally perfect man and woman. Perfection is imperfect unless it is a perfect whole. Even the minute differences in the voice producing organs of different people and of their finger movement when writing, are by

many looked upon as safer guides than the face, not only as regards character but even as regards identity. Thus every portion of the body and every action of every organ helps to indicate to the instincts rather than to the intellect the true nature of the individual.

When under the condition of modern society two prospective lovers meet, Instinct says to Reason: "You have invented high-heeled shoes, steel-ribbed stays, dresses, and all sorts of form-improvers, you have invented systems of education which give a polish to the outward form, and hide the substantial defects of the intellect, you have surrounded with most complicated devices an object, which, if it were only a little more natural, I could read with greater ease than you can read a book, you have done all this, and I now demand of you to unravel the mysterious female to whom I feel attracted. Tell me is her wit natural, or do you recognise her sayings as being mere quotations? Does she love music or has she been trained to play and sing in a style which gives this impression? Is her face painted, or is the bloom on her skin natural? Is her hair all her own, and its colour natural? Are her teeth ivory, or enamel? Would her figure be what it is without the support of iron ribs?" Poor manly reason, what can it say? The conventions of civilisation do not permit of enquiries being made into these subjects, and in many cases the instinct is misled, a one-sided longing sets in, and the man's misguided instinct finds itself powerless to create the expected mutual attraction. If, as often happens, the instincts of both parties are misled, and a marriage results, a mutual disillusionment subsequently sets in which is all the more painful if the parties discover that the attractions which they once felt for other individuals and which their reason had crushed out of existence, was true love.

Even in those cases where no selective mistake occurs and where during the period of courtship every effort is

made to attain success, reason cuts a very poor figure. The conversation of lovers is proverbially the most inane that can be imagined, the cooing of doves and particularly the songs of birds being charming in comparison. In fact it is hardly an exaggeration to say that lovers are drawn together in spite of their conversations and behaviours rather than because of them. Reason's activity on these occasions is so unreasoned that it must be assumed that it is merely carrying out the dictates of a tyrannical master, the love instinct, which seems to insist that there ought to be no mistake and that the object of one's adoration should be acquainted with all one's imperfections, but of which the instinct more or less correctly divines that they are balanced in the adored object by complimentary attributes. If reason acted reasonably, it would say: "My master wishes to marry this particular girl, I must show her all his perfections and hide all imperfections." The instinct says: "Nonsense! I do not trouble about individuals, I am acting under the orders of the great manifestation of energy, under Evolution, and I owe my existence to a striving to perfect the human race. I am concerned with the next generation, and it is essential that the two individuals whom I am now inspiring shall constitute a harmonious whole and not their outward appearances or their possessions and accomplishments. You, reason, have created a host of civilised artificialities, brush them away for a time and let the two become mutually conscious of their true inwardness, do not trouble yourself to exhibit their acquired accomplishments, disclose their characteristics and do not bother yourself whether they appear imperfections or not. I would rather that you, their guide amongst artificialities, should reveal that they are not suited to each other than that they should make the discovery after they have become the parents of one of the next generation." Under such a bullying master, or upper servant, poor reason does and says all sorts of unreasonably stupid and even offen-

sive things, which, if there is true love between the two lovers are as promptly forgiven as they are uttered.

The case is of course quite different where there is no real love, where a fortune or other advantage is the object striven after during courtship. Then reason has a chance of acting admirably according to its own lights. Its language is now perfectly under control, perhaps carefully prepared beforehand, and even put into verse, all bodily and intellectual imperfections are artfully hidden, while foreign perfections are palmed off as one's own. The intention is to mislead, but the instinct is rarely quite taken in, and many an individual, both male and female, has been saved from the wretchedness of a married life with an uncongenial partner by giving way to what friends will have called a whim, when he or she has allowed feelings, perhaps only faint warnings of the puzzled instinct, to overrule all reasoned considerations.

It should never be forgotten that for a time two lovers lose their individuality, they are as much one system as is the Sun and its planets, Jupiter and his satellites, the Earth and our Moon. The Moon attracts the Earth just as much as the Earth attracts the Moon, and it is their common centre of gravity, not their individual centres, which describes an ellipse round the Sun; astronomically speaking, the two are one. Similarly in chemistry: hydrogen and oxygen, when combined chemically are practically one system and their affinity, which manifests itself during combination, as in the intensely hot oxy-hydrogen flame, is a mutual one. Hydrogen by itself, or oxygen by itself can be raised to a white heat, but that is not chemical affinity. This white heat is merely an imitation of the effect which the affinity can produce, and similarly the white hot passion of one individual for a cold and indifferent object is a mere imitation of love, is a whim, not an instinct.

Various complexities of the sexual instinct have already been pointed out, but to be able to harmonise these and to

survey the instinct as a whole it is necessary to remember that love is a double-dualism, and that it is imperfect not only if love is merely one-sided and not a mutual affair, but also if there is no wooing, a process by which alone mutual attraction can be created.

Where this power does not appear, there the perfect instinct does not exist. A magnet brought near to a piece of iron makes a magnet of it. It is not the magnet which attracts the iron, but both objects attract each other. This attractive power is not created by a magnet's approach to other metals even if they are similar to iron in colour, like platinum, lead and silver, etc., and there cannot in such cases be a trace of magnetic attraction. The magnet cannot draw these metals and they cannot draw it, other forces, not magnetism, sway them. Similarly where the wooing efforts of one individual are powerless to raise a counter attraction, there the perfect sexual instinct does not exist. The cold object is moving independently of a potential attraction. Of course a change of condition may create the necessary permeability for the mutual attraction, just as a piece of iron though it cannot be attracted by a magnet when it is hot responds at once to the impulse of the magnet when it grows cold, and then it too makes the magnet feel its changed condition. Similarly a despairing wooer who is growing conscious of the fact that all his efforts are unable to create the mutual love which he desires, may suddenly become aware that a change has occurred in his adored one. The elation which in such cases instantly seizes the wooer, the realisation that true love has come into existence, is perhaps the best experimental proof that the sexual love did not exist when there was only a one-sided longing. Such a one-sided longing stands in the same relation to true love as the sweetness of poisonous lead salts stands to sugar, as does the hunger sensation of dyspepsia to real appetite.

A mere one-sided longing and a mutual attraction, are

two different powers, almost two different instincts, the rudimentary one the mere one-sided longing of young people, may either develop along natural lines until it ripens into mutual attraction, or may be intensified by reasoned means and may then develop into a mere craving for sexual excitement. This development is, one may say, universally admitted to be the extremest form of immorality, and it is from this point that the subject will here be treated.

Now the possibilities of intensifying the sexual craving are naturally greatest when it makes its first appearance in the young, being of course then in a stage of rapid development. If left to itself the rudimentary instinct slowly ripens into one of potential mutual love. If interfered with by reasoned devices, such as lewd conversations, books and above all by bad examples, as often happens at schools, the as yet one-sided instinct is intensified into a craving for sexual excitement which finds expression in the practice of onanism. The immediate and after effects of this vice, both on the constitution of children and on their mental development, are so alarming that it is looked upon by parents and schoolmasters as being rather a grave danger than an immorality, but the secrecy with which it is carried out and the guilty feelings by which it is accompanied, stamp it unfailingly as an immorality. This view would receive overwhelming confirmation if it were possible even only to name some Oriental sexual abominations which grow out of these childish practices, abominations which in Northern Europe are treated as felonies. Children who constantly associate with others a few years older then themselves are exposed to the danger of learning how by artificial means, *i.e.*, reasoned and therefore unnatural ones, sexual excitement can be created at will. In previously considered cases of immorality it was the intellect which intensified a full grown instinct, here, however, an immature instinct is by reason both intensified and misled along an unnatural path.

Identically the same form of immorality is recognised in the case of prostitution, for here too, the one-sided sexual cravings of individuals are excited by artificial means, because an individual which, for the reasoned objective of pecuniary gain, will lend its body for such a purpose is not a natural being but an artificial device. This seems to be the popular interpretation of sexual immorality. The feeling is similar though not so strong with regard to the intensification of one-sided wooing, known by the name of flirtation, and applies both to those cases where a heartless flirt creates attraction in others without having the power or the desire to be attracted, and those cases where the individuals court and actually attract each other merely for the sake of the excitement of the sensation, both intellects knowing full well that there are barriers between them which are quite insurmountable, or perhaps both are aware of convenient barriers behind which they can retreat if matters tend to go further than cold reason deems advisable.

A few words may here be added on the subject of courtship. It has been pointed out that this part of the manifestation of the sexual instinct, the attraction phenomena between two individuals, stands in the same relation to the sexual instinct, as the induction of magnetism in a piece of iron stands to its holding power. It is an intensification of the mutual attraction of two individuals, and being only a subdivision of the complete or perfect sexual instinct it is not easy to conceive of its being exaggerated unless, as in heartless flirtations, it is itself unreal or imperfect, so that with regard to real courtship or wooing it would seem as if the intellect could not exaggerate it into an immorality. This partial instinct, can, however, be crushed, which is the nature of a crime, as for instance in oriental marriages and so-called occidental matrimonial alliances, for in these cases the bride and bridegroom either do not see or do not know each other before marriage. Of course, after marriage

wooing may be indulged in, but where this is not the case, as with legal pronouncements of restitution of conjugal rights, where the wife's marriage promise to obey the husband is insisted on, there it is felt that crimes of the nature of rapes are being committed, and rapes are crimes because they entirely dispense with the wooing instinct. According to a Roman legend this crime was so serious that when it was indulged in by a king it led to a change of the constitution of the State.

A feeling of immorality also attaches to all those means which are employed by reason for the intensification of the complete instinct, but the instinct is in itself so intense that it is difficult to say in any particular case whether it is being intensified or is merely developing naturally. The distinction can, however, be drawn that reason is acting either as a servant in furthering the object of the instinct, or it is the meddlesome master employing artificial means for intensifying it. There will therefore be no feeling of immorality if reason assists at ripening a perfect mutual instinct, not even if by means, which of course are always artificial or reasoned, it leads to transgressions in other departments. This is popularly expressed by "All is fair in love." But a feeling of immorality at once attaches to reason when it employs artifices in intensifying sexual excitements. The frequent changing of mistresses and lovers is one means of maintaining the excitement at fever heat, and this accounts for the great distinction which is made between people who lead a dissolute life, especially if amongst prostitutes, and an unmarried couple who are faithful to each other. This may also explain the feeling, not confined to Christians, that polygamy and polyandry, although sanctioned by the laws of some countries, are somewhat immoral institutions, even though the first of these is one of the most effective checks on prostitution, perhaps the only real one.

It might be urged that these views are opposed to some

of the most generally accepted ones of the wisest men of the Earth, but a study of the lives of the writers of maxims and proverbs generally shows that they were men who at one time led immoral lives, immoral according to the definition here adopted. In their youth they outrageously intensified their sexual instinct to such an extent that it died prematurely, and in their impotency, feeling happier than they did under their early abnormal condition of living, they, being good men at heart, wished to impress their fellow men with the belief that the sexual instinct itself, not its exaggeration, is an immorality. Schopenhauer as a youth wished to emulate Lord Byron in Venice and in his riper years preached abstention. Saint Francis was said to have been as wild as Don Juan and like him retired to a monastery at an early age, and it is due, perhaps, only to an inability of the latter to write down his feelings, that we have been spared another volume of proverbs on the subject of how to live happy by becoming impotent or ceasing to be human.

What is the use of reason if it cannot teach how to live a happy life? People might as well be guided in their every day actions by utterances of reformed drunkards, thieves, and prostitutes, as follow the petrified and classical ascetic teachings of reformed rakes. The case is not very difficult with regard to the teachings of men like St. Paul. His remarks are far from being puritanical, but that was due to their being addressed to Greek citizens who, especially the Corinthians, were leading excessively immoral lives, yet even to them he says that his are merely personal views and he hints that he belongs to a class of beings who are not perfect men. If that was his condition, then, others who do not suffer from a bodily imperfection, real men, should be careful about following his personal views, even if, as may have been the case, he had garnered them from conversations with others.

His teachings have certainly had a powerful influence on Christian practices and if any father of the Church

can be held responsible for Catholic Monasticism it is he. This practice is nothing more nor less than the crushing of the sexual instinct by reason, and here again if popular feeling be consulted, it will be found that such practices are classed as criminal. Bodily mutilations which were once encouraged by the Church are, in modern Europe prohibited by law. The Reformation as well as the expulsion of monastic orders out of most European countries were powerful popular protests against the enforced leading of ascetic lives, and some peoples' loud protestation against prostitution is dictated mainly by a feeling that it is a crime against innumerable virtuous girls who now have to remain single, whereby their sexual instinct is crushed.

The main points of the subject have now been touched upon, but its complexity is so great and its bearing on social matters so important that it cannot be dismissed with these several generalisations, and it seems desirable to deal with at least the one special case: sordid marriages. One excuse for these alliances, as they are often called, has already been given, that the love instinct like all instincts is ashamed of itself as it were, and the individuals who are under its sway not only deny its power but profess that they are attracted to each other by advantages which reason can grasp. Nothing can therefore be more natural than that the guardians of the young should take advantage of this weakness and invent the code, that young people, if they are aristocratic, should feel most strongly attracted by others who are still more aristocratic, and if they are rich, they should feel attracted by others who are even richer. It will however be felt that, face to face with a more serious view, the above is but a flimsy excuse.

As already pointed out the reason why prostitution is popularly classed as an immorality is because for a reasoned consideration, such as money, trinkets, etc., one individual which may be classed as an artifice, intensifies

an imperfect because one-sided instinct which is for the time being ruling another individual. Now it should make no difference, and in popular estimation it makes comparatively little difference in judging of this subject, as to what is the nature of the object for which a person sells himself or herself. As long as the sexual instinct is imperfect, as long as there is only a one-sided craving and more particularly in cases where even this is missing, as in sordid and conventional marriages, and in conventional ideas about conjugal duties, so long, according to popular feeling, the sexual act is an exaggeration of what little sexual instinct there is, and this is classed as an immorality. Even a cursory view of popular novels, which are popular for no other reason than that they reflect popular views, will reveal that it is only the bad characters—the author taking it upon himself to brand immorality as something wrong—who marry for reasoned objectives and not because of mutual love.

Now, even those who do not go so far as to say that every act which can be classed as immoral or criminal must also be sinful, will object to having reasoned marriages, or matrimonial alliances as they are called, classed as mercenary barters of the sexual instinct, but they do make this distinction, that marriages in which money considerations have swayed the choice of a man, are more immoral than those in which a woman has married for money. How is it that people feel a difference? Why does it not seem very wrong for a girl to set her heart on marrying a man who has the power of providing her with every entertainment and luxury? And why is a man despised who marries a girl for such an advantage? What is the difference? Surely not in the ability to earn money and such desirabilities as station and distinction, for these may, nowadays, come from either side. Possibly the distinction is due to a feeling that a woman's conception of property is different from that of a man. To her it is an object, to him it is a means to

an end. Is it not also possible that the difference is due to a feeling that, even when women profess to reason, when they either argue or let themselves be persuaded into the beliefs that it is better to smother dislikes and to marry for money than for love without money, that they are at the time swayed by an instinct? If so, then this instinct is perhaps of a higher order than sexual love, one which is of more importance to the future of the human race than the mere perpetuation of the human species.

Unfortunately, instincts are either very timid and prefer to act without being recognised, or else reason is overbearing and makes its owner believe that the most unreasonable instinctive acts are reasoned, even if the mad results which sometimes follow, prove the reasoning to have been unreasonable. Outsiders know better, and seeing that the ancients had a way of worshipping most instincts under the guise of patron gods, one may hope to find a clue to this mystery in Greek mythology.

Now it is well known that the worshipping of the gods was costly, but, with one exception, the donations to the priests were mere offerings towards current expenses. This exception was the Venus cult. The popular belief that sexual acts constitute Venus worship is not correct, to be complete these acts had to be accompanied by presents. In other words the goddess, who, for the time being, would be represented by one of her priestesses, insisted on being treated as what is now called a prostitute. Her worshipping formula probably included the words "With these worldly goods I thee endow."

If this custom meant anything, and ancient mythology is by no means meaningless, the goddess refused to recognise as a true act of worship the embraces of a man who could not prove by the giving of presents his ability to earn money. The goddess of fruitfulness of the agriculturists, not of the townspeople, had set her face against the procreation of thriftless beings, of those who could not get on in life, but she encouraged those to beget

children who had the gift of succeeding in their undertakings, and she, therefore, insisted that only when sexual love was combined with a gift from the man, should it constitute her worship, and only then should it be sanctified. Conditions have hardly changed since then. Money is, of course, a revived form of wealth, but jewellery, and ornaments in general, the precious and the rare, have, in all ages, been valued by man because they were the fittest offerings during Venus worship. There would be no value in a jewel if it were not an acceptable offering on the altar of love, *i.e.*, if it were not the proof of the power of the giver to acquire it. The Alpine rose is a sweet but valueless flower, for it fades, and it is appreciated only when it proves the giver to be possessed of enterprise, climbing power, and other perfections. That is why legends about rare gifts from mythical heroes to the objects of their adoration are alleged to have been wrenched from giants and monsters. Nowadays they can be bought for money, but wherever one sees sparkling jewellery adorning fair women, there one surmises that it represents the outward sign of a perfect Venus worship. For this reason, no doubt, the world does not approve of maidens bedecking themselves with jewellery and men who do so are despised.

This teaching of the ancients, that the goddess, Venus, will not recognise sexual love as true worship unless it be accompanied by proofs of the ability to succeed in life, suggests that they recognised an instinct superior to the one which only aims at reproducing life. Is it not possible that women possess an instinctive feeling that they should confer their love only on those who by their fellow men are recognised as superiors? Now, all other instincts rely on the senses for guidance; this one relies, apparently, only on the intellect. The general sexual instinct exerts a mutual attraction after personal acquaintance, but a hero, even if he has only been read of or talked about and not seen, is often worshipped

intensely from afar, and everything, even existing attachments, are sometimes freely sacrificed in exchange for his love or for the expectation of it. This seems to show that women, or at least some women, acting apparently on behalf of the highest aims of Evolution, are capable of being influenced by the ever-changing essentials of success in life, but unable themselves to divine who possesses them, they rely on the voice of the general public, and lionise him who is pointed at by the multitude as the man who has grasped the essentials of success.

Even the man who barely escapes being convicted for having over-reached his fellow men or the state, is likely to have as many fair admirers as the man who is equally much talked about for some beneficial public act. Does naturally flock to the royal stag who has vanquished his rival? This is not done because of any power which he may possess of protecting them, on the contrary, the members of his harem are his guardians, not he their protector; they warn him on the approach of danger and otherwise serve him. It is the race improving instinct, as distinguished from the race perpetuating instinct which draws a crowd of does to the stag that has proved himself superior to others, and which desires to have his race improving qualities perpetuated.

The women of Oriental races have, during thousands of years, placidly accepted the husbands provided for them, and have consented to be locked up in harems, whereby they have, as it were, shown that they are not subjected to the lionising instinct, but are content merely to be married. The women of those Oriental races who have settled amongst us and who plainly wish to identify themselves with their European neighbours, never, as far as can be ascertained, appear in divorce courts, nor do they give any other proofs that they are swayed by that strong power which drives some European women to centre their affections on one particular man even while tied to another. In the East the women have never during 7,000

years, either in hot or cold climates, under savage or civilised conditions shown that they possess the lionising instinct. In Europe it is different. Byron, when he woke up to find himself famous, also found all women doting on him. A musician is suddenly boomed and shoals of women flock to clip his curly locks, hoping, perhaps, that he will take notice of their adoration. An artist is similarly praised, perhaps only by his dealers, yet from that day he may choose the models for his antique pictures from amongst high-born dames. A victorious soldier or sailor is practically overwhelmed with invitations from women, no matter whether married or not, in fact le Grand Condé and other princes fought their elegant battles merely in order to facilitate their female conquests, they did not fight like Napoleon for military objects. Even the retiring scientific discoverer of some law of nature does not escape from what to him may seem persecution, and the rising barrister, the fiery orator, the persuasive curate, and above all the inspiring actor, are all lionised.

Blind as all instincts are, this race improving one also hides its real aim, which is the perpetuation of the noblest of the species, and instead it professes that it is merely emulating the sovereign and is rewarding merit where it can be found. Under modern conditions of life, therefore, its real aim is not carried out, for those females who cannot marry the hero of the day, either because he or they are married, will take care that while rewarding him, as they profess, they do not complicate matters by perpetuating his characteristics.

If some should urge that this female instinct is merely a modified love instinct and therefore a personal one and not, as here supposed, a worship of an impersonal object, *i.e.*, public success, let them consider the case of Cæsarism. It was certainly not hidden under a bushel, for if ever a man combined in his character all the essentials of success, it was Cæsar. The whole world had felt and

proclaimed his personal power; there had been kings, and kings of kings, but never a Cæsar. He, a mere patrician, had in a few years attached to himself the supreme offices of Ruler, High Priest, Chief Judge and Military Imperator, Tribune, and other posts. No wonder that he was lionised and that even a queen of the most ancient kingdom of the Ptolemys, a descendant of the gods, should deem it a privilege to become the mother of his son. She worshipped Cæsarism, a principle, and he personified it. When he had been killed, her worship naturally devolved on to the succeeding representative of Cæsarism, but though Cleopatra bore Anthony three children and though his personality was more charming than that of Cæsar, she turned without hesitation from him who proved to be merely a perfect lover, to the true Cæsar, Octavius, a lad whom she had not seen, but whom the world was already proclaiming to be a worthy successor to his great uncle. She worshipped Cæsarism, and her instinct prompted her to be the mother of its children. Her love for the individuals may have been real, but it must have been of a subordinate nature, she came to grief because she could not know that the youth whom she had helped to be victorious over her lover did not intend to yield to the charms of a matronly queen.

All men cannot be Cæsars, but some can nowadays show their superiority over others by making money, which is one of the essentials of modern successful life, and assuming that the race improvement instinct is a real one, it should be as much an instinctive action to fall in love with a money making man as with a hero or artist. If such marriages are demanded by this instinct, even if they exaggerate or crush the more primitive sexual instinct, they cannot properly be classed as immoralities or crimes. The distinction may, however, be drawn that men who evidently do not possess this instinct, are committing immoral acts if, in the absence of mutual love, they marry for money, station, etc. Women also who are merely

obeying a class or family law when they marry men against their personal inclinations are committing immoralities, especially if their husbands are not the superiors of others. A Lancashire saying has it that there are only three generations from clog to clog, that the grandson of a self-made millionaire will again be a labourer, and to marry a man who has accidentally become rich, perhaps by inheritance, but has not even the gift of retaining what he has, is to propagate a species of spendthrifts, which is surely not a race improving process. A distinction may also be drawn between those who do and those who do not propagate the superior species when found. A mistress, or a wife who deliberately binds a successful man to herself merely for her enjoyment, and who uses every means to prevent children being born to him, is practically crushing an instinct and thus committing a crime, more especially as, if her lover were granted fuller liberty, his characteristics would be propagated by another. The lionising instinct would appear to be of a higher order than any intensification of the ordinary love instinct and it may even be opposed to it; at any rate it is difficult to imagine a very lovable woman being swayed by it, for a woman who feels attracted by the reputation of an unseen man does seem somewhat unwomanly, though possibly of a superior nature.

Considerations like these, vaguely felt, are no doubt at the bottom of the general disapproval of sordid marriages, for, if the objective with regard to them is a mere wish of enjoyment, of wealth, every effort is likely to be made to remain barren, and that may be taken as the indication of the absence of mutual love without which married life must be looked upon as being an immorality.

The question of sordid marriages thus assumes the appearance of great complexity, but that is only because the whole sexual subject is an intricate one. With eating and drinking it is easy to say that the artificial intensification of such cravings as hunger or thirst are

immoralities, but even there a difficulty arises when the simple case is considered of cooking and of preparing fermented drinks, which, if they do improve the appetite and as such may be called immoral, yet also assist digestion and reduce the feeding periods to a minimum, whereby much spare time can be devoted to other objects.

With regard to the larger question there is the general complication that courtship is a portion of the sexual instinct, that the sexual instinct is a mutual one, that if one-sided it is a mere craving of which each half can be separately exaggerated into heartless flirtation, onanism and prostitution, and to add to this confusion, there appears the race improvement instinct which gives women carte blanche to trample underfoot the simpler personal love instinct and to behave like priestesses of the goddess of prostitution, attaching themselves only to those who by their wealth, station, or popularity have the public stamp of being successful. Some hesitation must therefore always be felt in calling every sexual immorality immoral, more especially as the general feeling about this matter is an uncertain one, as will be seen when it is remembered that some reasoned marriages may be highly immoral, and are by many branded as such, whereas the devotion of a mistress to a wealthy or celebrated man, and the enthusiastic encouragements which many women offer to lions of the day, may, in the eyes of others, even in the eyes of those who condemn mercenary marriages, appear as being moral acts. Few people, not even her husband, condemned Lady Hamilton's devotion to Nelson, and those who did, affirmed that her partiality was dictated by love of notoriety. Then, too, if Cleopatra and Catherine II of Russia be compared, the former is, one might say, the model of virtue. She followed without hesitation or reserve one of the instincts which aimed at improving the human race. Even Socrates could detect no immorality in letting his wife share in lionising a great man and freely lent Xantippe to Alcibiades, the

rising star of Athens, while Plato urged that husbands should not withhold their wives from men who had been of great service to the State.

Although, as is clear, the sexual instinct is a most complicated one, and although this subject is mixed up with ancient teachings, it is hoped that in this case, too, it has been made clear that, as with other instincts, the expressions immorality and crime attach to reason's intensification or crushing of this instinct, and that here, too, the popular feeling is, that reason has merely to guide this instinct among the artificial edifices of civilisation and to guard it from coming into conflict with codes and laws which the reasoning power of the nation has set up. It may also be asserted that if certain interferences of a man's reason with his own instincts is either criminal or immoral, these reasoned actions, if carried out against other people, have an exaggerated effect. A man who murders another is, especially in the eyes of all past ages and all Eastern nations, a greater criminal than the man who takes his own life. A man whose reason persuades him to torture himself either for penance by mutilation, or in India for purposes of salvation, or amongst the Red Indians to test his pain enduring power, who glorifies in a suffering of hunger or thirst, such a man is at best mildly criminal and had better let himself be guided by another brain which has a superior balance. But the man who tortures, mutilates, and starves another is a fiend. A man who remains poor because he will not or cannot save, who has crushed his grasping and saving instincts is a fool, or perhaps mildly criminal: a man who deprives his neighbours of their savings and makes them poor is a robber. Similarly it is immoral, for instance, to write lewd books and thereby exaggerate an instinct in others, and if it is criminal to crush one's own instinct, it is doubly criminal to crush it in others, as is often done when wills are drawn up which aim at prohibiting widows or children from marrying, or

from marrying people of their own choice. The prohibition of marriages amongst Government and other officials, and locking up of people in monasteries, are equally of the nature of crimes.

These remarks, though dealing largely with the marriage question, have been made chiefly with a view to showing that the natural, the instinctive feeling of the Caucasian race does not materially differ from that of others who see nothing immoral in the sexual act. Circumstances, however, have introduced the complication that in religious circles the eating of the fruit of the tree of life is both branded as being the sin of sins, and also raised to the level of a sacrament in cases of Church marriages. If, however, the ethical views of people who have been brought up under this influence are examined, it is found that they are exceedingly weak substitutes for the very simple and straightforward view here adopted, that sexual immorality is the intensification by the intellect of the sexual instinct. Puritanism, and its children, have adopted the orthodox Church view, and in the eyes of many pious writers, everything which tends towards the sacrament of matrimony is virtuous, and as illicit love does not tend in that direction it is immoral. This view is too weak to be called an argument but it is fortified by repetitions of the saying, that modern civilisation is founded on the sanctity of Church marriages. How about the ancient and Oriental civilisations? Have they to be ignored? It is far more correct to say that European Society, not its civilisation, is founded on the Catholic marriage, and that perhaps the high position of women is due to the Roman insistence on the indissolubility of the marriage bond. It is therefore but natural that women, even now that civil marriage contracts have been instituted, cling with loving fondness to Church ceremonies.

Another official view about sexual ethics is that illicit love is a vice, and marriage, because it counteracts it, is a

virtue. This view is like a parting shot generally fired only once during a lifetime at a bachelor on the day of his marriage, and is attributed to St. Paul (Corinthians 1, 7), but in fairness to him it should be remembered, that he had to consider that by closing the heathen temples against his flock he was tempting many young men to frequent haunts in which felonious abominations were practised which were banished even from the temples of Venus. There were no Church marriages in his day, and had the English translation of the Bible been more precise, it would be evident from the text that he adopts totally different words for the official marriages as between members of the *gens*, and the mere living together as man and wife which was all that was possible amongst slaves, and these are expressly mentioned by him in verse 21; yet both these conditions are referred to in the translations as marriage.

Yet another view is held by people who pride themselves on being intelligent, and who worship intelligence wherever they think they see it. They urge that in all matters, man should be guided by pure reason, and seeing that the sexual act is an instinctive and therefore an unreasonable one, it should not be indulged in. According to men like Schopenhauer who, with Hamlet wished he had not been born, it is even a sin to be instrumental in bringing children into a world which to them seemed one of suffering. Another section of these worshippers of the intellect argue that as money is the chief thing in their estimation, people should marry for money; but slightly extended, this view would encourage prostitution. Others like Bradlaugh and the ancient Greeks, agree with Schopenhauer, but not wishing to forego the pleasure of love they recommend practices which are only slightly less immoral than onanism. No wonder then that most people turn from men of pure reason and accept almost any dogma which is sufficiently firmly established.

Confirmed bachelors, as a class, evidently hold the view that children are a burden or that marriage is an inconvenience, and that in either case it is an unreasonable institution. The same views are being effectively instilled into the female employées of the Government Departments and of industrial undertakings by prohibiting them from marrying. Generally speaking, therefore, it may be said that official views on sexual ethics may be considered to be very mixed and are, therefore, poor guides. But these codes and dogmas are not without their meaning; they are so many edifices of civilisation which it is the evident duty of reason to locate as it were, and to steer the sexual instinct safely through. Unfortunately some are deliberately designed to intensify, others to crush the instinct, and those individuals who do not wish themselves to be carried in either direction, who wish to be neither immoral nor criminal, either with or without the sanction of the law, customs, codes, etc., must often experience great difficulty in shaping their courses.

Humanity does not excuse drunkenness in members of a club whose code it is to drink deep and long, nor would it treat as an extenuating circumstance the fact that a drunkard had drunkards for ancestors. Similarly, humanity in general, and often the victims too, attach a strong flavour of immorality to sordid marriages, even if customary in their caste, or if ancestors have done the same, and, at any rate, most courtesans might plead the similar excuses, that their caste sells itself for money and that most of their ancestors had done the same.

A few remarks on the general question of immorality, virtue, and crime are, it seems, a desirable ending to the last three chapters on general and sexual ethics.

It will be noticed that throughout these chapters no attempt has been made to determine whether crime and immorality are sinful, or untrue to nature, nor is this possible until it has been ascertained what are the natural

strivings of energy or life, but a few remarks as to the position which virtue occupies in relation to crime and immorality may be of interest. Virtue, from the point of view here adopted, should be, what it has so often been called, a narrow path. It is a mere line, the boundary between immorality and crime, which are two precipitous flanks of a mountain knife edge. A virtuous man, in the possession of perfect instincts and perfect reason should hope to walk along this path, joyously erect. How can this be expected of those, who from their childhood have been classically trained not to think, not to grasp situations, but only to remember, and always to remember, who have been told to tread the lofty path blind-folded, like giddy tourists who dare not contemplate the world, but who have to clutch nervously at the alpenstock of their guide, which represents the maxims of reformed but dead profligates or criminals. It gives what people are pleased to call a moral support, but maxims can no more save them, in the face of living difficulties, than a guide's stick can save a blind-folded man who stumbles when on a precipice.

Life is a comparatively easy walk to children and savages, at worst it is the rounded back of a mere sand-hill. When down they can run up again without fear of coming to grief. A child knows nothing about laws of property and cannot be said to steal when it takes other people's belongings. It is no glutton if it overeats itself, as it probably merely follows an instinct which demands that its little stomach shall now and then be strained to over exertion. It is different amongst grown-up people living in civilised states. Their path of virtue is not a natural one, being more like a wonderfully carved building than a rock, and it has fewer footholds the higher they proceed and the older they get. If their feelings revolt against being blind-folded, like the giddy tourist, and if they cannot walk erect they naturally crawl, one hand and foot hanging over the criminal side to prevent their being over-

balanced into the abyss of immorality, and vice versa. One man abstains perhaps from alcoholic drinks for fear of being a drunkard, but indulges to excess in the nervous craving of tea drinking, and smoking, and another perhaps encourages prostitutes for fear of being tempted to covet a neighbour's wife. Some would rather be criminal than immoral, they prefer to crush every instinct rather than faintly encourage one. Others, preferring not to be criminal and not to crush instinctive enjoyments in themselves or others, intensify them, and while professing merely to give free play to their natural instincts they employ artificial devices of civilisation for the purpose of intensification. The mere fact that property bears interest, and that people can live on it without working, makes numbers of instincts superfluous, so that to keep them in full activity is in itself an intensification. The lazy man who persuades himself that he must eat and drink as much as a hard worker is really a glutton.

Why should the path of virtue be so narrow that practically all people have to be either immoral, criminal, or both, or debarred from using their reason? Cannot civilisation be both lofty and sufficiently broad-backed to let average men walk erect, perfect men with unfettered intellects and with wholesome instincts? There is no yes or no to this question which has been put by all men at all ages. Such answers as have been formulated have been classed as socialistic. They are multitudinous in their forms because of the multiplicity of the complaints against the petrified edifices of civilisation, the works of that very reason which is now urged to pull them down again, and has often done so. No wonder that the irksomeness of being virtuous is like that of traversing the rubbish heaps of ruins which have been built up and pulled down during the past ten thousand years. The question, let alone the answer, as to why this should be is most difficult to put, but in the hope of clearing the deck for action, in which others may engage if they like, an attempt will be

made in the chapters on State Ethics to throw overboard —one need not call them lumber—the masts and sails of lofty classical and mediæval speculations, so as to be able to start afresh with modern facts, no matter how difficult it may as yet be thoroughly to grasp and explain them.

STATES.

Personal Ethics deal with the interaction of the personal intellect on the personal instincts. Both are nerve functions. The instincts, both natural and acquired, have been treated as being of the nature of petrified memory, whereas reasoning is a process, which uses the remembrances of the past as a raw material and by a nerve effort predicts the future. The exaggeration or suppression by reason of an instinct appears to have been defined as being respectively either immorality or crime; this vote of censure, for such it seems, indicating that these actions are contrary to the striving of energy which is life. This view is extended to inter-personal relations, and it is felt to be immoral or criminal for one person's intellect to intensify or to crush another person's instincts.

It seems also to have been felt in all ages that there is a reasoning power in states, whose interference with personal instincts, so called personal liberties, is of the nature of an immorality or crime, and students of history cannot help drawing the conclusion that even the exaggeration of national tendencies or their suppression are respectively of the nature of state immoralities or state crimes. Unconsciously states are treated by students as being still higher specialisations of energy than persons, and that therefore a perfect state life can be aimed at as well as a perfect personal life.

What are states? And what in them are the representatives of personal instinct and reason? One is tempted to follow the lead of the classics who raised ideas, such as Wisdom, War, Love, etc., to the level of deities, and therefore, personalities, but these are not the person-

ality of the state but are its instincts and reasoning powers. Venus represents Love and feels no immorality in being what she is: Minerva is cold Reason and cannot conceive that there is a criminal tendency in those who are devoid of natural instincts. It is therefore more convenient here to treat these patron gods, the collective ideas which sway mankind, the great and small tendencies of nations and states within states, as taking the place, not of persons, but of personal instincts. Then almost naturally the whole of a state, of a substate, or of a collective community, etc., can be looked upon as the personality, and the reasoning processes of this state appear as its educational system.

A preliminary trial of this simile shows that it should be an immorality on the part of the state if, through its educational powers, which is its intellect, it exaggerated a state tendency. Thus if a fighting instinct, like that of the Assyrians, Spartans, Romans, Arabs, and Red Indians was a state tendency of these nations, or as Fielding Hall might put it, the soul of these people, and therefore a something with which they were as much in agreement as a quarrelsome man is in agreement with his fighting instinct, then it would seem immoral on the part of the Assyrian educational system to intensify this tendency into one of delight in fiendish massacres, by teaching the populace to enjoy wholesale executions of the most cruel kind. It would seem immoral of the Roman State, publicly to execute their prisoners and to encourage the public murders in the arena. It would seem immoral for the Red Indians to train their children to attack and murder defenceless prisoners, etc.

Cases in which education, nearly always associated with Religion, has crushed the fighting instinct of a people are the well known ones of Burmah and Tibet. Although not only Buddha's teachings, but also the implicit obedience of his followers, deserves the greatest admiration, a feeling remains that it is almost a state crime that his

disciples should have been prevented from using both their bodily strength and their reason and all its powers in the defence of their homes against Mohammedan invaders, and more recently against Christians.

These few examples will, it is hoped, suffice to show that the somewhat arbitrary analogy between states and persons, state tendencies and personal instincts, education and personal intellect is a workable one. It will, therefore, now be possible to make closer enquiry into what constitute the different organs and factors of a state.

States, will here be looked upon as being both large and small combinations of individuals. There are states within states, not only are states divided into tribes and formerly into families, but each caste, each community is a substate. Guilds, trades unions, professions, even the subdivisions of professions, such as officers versus privates in the army, society groups, both amongst the fashionable and the labouring classes, cliques and coteries, and a host of others are states, and these have their own state tendencies or souls of their own, representing state instincts; they also have their own systems of education, their codes, which represent the state intellects or thinking processes.

When dealing with individual instincts it was not necessary to draw marked attention to the well known fact that there are innumerable nerve centres in the body carrying out their functions, and that while reacting on each other they spend an enormous amount of energy which does not actually show itself; but few people are aware that it is only a very trifling excess of energy, a small surplus, one which is not consumed in internal or constitutional work, and which obtrudes itself on the outside world as a man's character, as his instinctive tendency, as his soul. Sometimes it is a fighting tendency or a saving or spending tendency, etc. This surplus disappears when a man's instincts and other nerve functions are battling with a chronic disease or with a bodily defect; his character is then of little account, he is then

merely one man amongst thousands of millions. Napoleon was a man with a perfect bodily constitution, including an exceptionally perfect brain; his surplus energy, his character, dominated the world. Alexander was also a man of this class. Had these men been dyspeptic or bilious they would have taken the places of misanthropic Carlyles and Robespierres. The natural character, or one might say the surplus energy of a man cannot appear in all its glory if there is unnatural strife amongst the various bodily organs. If the bile does not assist the stomach, if the liver does not act in harmony with the blood circulation and vice versa, if the nervous system is absorbed in regulating internal friction, then even the memory and reasoning portion, the brain, is seriously paralysed, forgetfulness and weakness of reason take the place of mental alertness, and the character is not what it might be. Generally speaking, an invalid's character appears to the world as if it were broken, or where the character survives, as in old age, it is of a fossilized nature, unbacked by intellectual resourcefulness.

Metchnikoff has recently suggested that the marked difference as regards old age, between birds and reptiles on the one hand and mammals on the other, is primarily due to the inordinate length, and for us who live on cooked and therefore easily digestible food, the unnecessary length of the intestines. These afford refuge to infinite varieties and multitudes of microbes, whereas birds with short intestines have relatively few microbes. These harmful microbes and their products enter the blood, and a large number of giant or scavenger cells have assigned to them the duty of battling with them and removing them. From the middle of a man's life, say from the fortieth to the fiftieth year, most of the vital organs have been subjected to noxious attacks by microbes and the giant cells have by then not only cleansed these away but have also removed all those cells whose functions were impaired. It is true that they replace these and that a

person's bulk does not necessarily diminish with age, but the functions of the giant cells are of a different nature from those of the departed, and the liver, kidneys, nerves, etc., gradually undergo a structural change which is known as senile decay. The forms of the organs remain, the dimensions may even increase, but the substance is slowly metamorphosed. The old age of human beings commences at middle age, a parrot or raven remains the same lively bird almost up to the day of death. Their intestines and organs are not the battlefield of militant giant cells and injurious microbes.

A similar picture may be drawn of states. They have their vital organs, their states within states which, as long as they are healthy, act in harmony, even if they absorb much energy. But where is the healthy state which shows no sign of old age? In innumerable cases the giant cells have been represented by the military caste. They are powerful in their activity against outside attacks, but leave behind them an after effect, a change in the state, which has the appearance, at least to those who fought for the old order of things, of being something foreign to the true state, and then, generally, these same military forces are turned against this real or imagined danger. The use of military force even against outsiders is, in itself, a sign of ill-health, for only weak people are liable to illnesses, but if the result is a crushing of some function, *i.e.*, some state within a state, then the state has been weakened during its illness. Generally, such strifes lead to the domination of the military caste, but not always, for in most Buddhist countries it is the military spirit which has been crushed by the cultured castes, and the result is that such states are flabby in the extreme. The state constitution should be strong and not given to sneezing every time that it meets an influenza microbe.

Sometimes internal strife prevails amongst nationalities, as for instance between the Romans and Latins, etc., between the various Greek townlets and Macedonia,

more recently the internal German struggles between the Hapsburgs, the Saxons, the Prussians and in England the struggles between the Scots, Angles, Saxons, Scandinavians and Irish.

Sometimes it is castes and interests which strive with each other, and all states seem temporarily to be dominated either by landed Aristocracy, as in Germany, Bureaucracy as in Russia, Plutocracy as in America, Priesthood as in the Middle Ages and now in Brazil, Spain and Scotland. Even the legal elements once predominated during the bloody period of the French Revolution and in India and China the learned, or at least, cultured castes seem to have permanently gained the upper hand. The thriftless—who prefer to be known as communists or socialists—have sometimes tried to rule, but nature's slaves can never be masters for long, for they quickly choose a tyrant. All these cases are analogous to overgrown livers, diseased kidneys, excessive fat, etc., in the human body and therefore unnatural and incompatible with perfect state life.

When a strong man feels that his own personal tendencies are in harmony with the tendency of the state in which he lives, he will not only use all his power to further these mutual wishes, but will look with disfavour on all internal strife in a nation because it weakens the expression of its general tendency and kills the soul of the people. Bismarck identified himself with the very strong and almost universal feeling which existed amongst Germans for national unity, and as this could not be effectively attained with a multitude of principalities, thirty-six in number, fighting against each other, he strove to place them in a subordinate position. Another well known instance of a single man identifying himself with state tendencies is Alexander, whose life was devoted to the desire amongst the Greeks for revenge for the outrages of the Persians on their gods and temples. Cæsar and subsequent Emperors identified themselves with the slumbering World Empire tendency of the Roman patri-

cians, they had the conceited notion that they were born rulers. Later, both Charlemagne and Napoleon I. identified themselves with a similar World Empire tendency of the Franks. The German Emperor, the descendant of a family whose oldest members presided over the keen business men in Nürnberg, is identifying himself with the industrial spirit of the German race, a spirit which although strong in England has never found a Medici amongst its leaders. All these men will be found to have aimed at State unity and harmony.

The unification idea, more perhaps than the World Empire idea, had influenced many great men in all ages, but rarely has it swayed a whole state like that of Rome. With regard to English Colonies the idea was most powerfully represented by Cecil Rhodes and Mr. Chamberlain, but one cannot help asking has England, as a nation, such a tendency? Is the soul of the British Empire one of unity? Apparently, no. Not only are the Scotch, Irish and Welsh nationalities, which are states within states, constantly accentuating their divergencies of character and their independence of aim, but the marvellous popularity which Gladstone enjoyed gives the impression that he represented the true English tendency, and seeing that he taught the idea of Italy for the Italians, Greece for the Greeks, and each little tribe and interest for itself, and as he was the champion of Irish separation and the intensifier of class distinctions, it is probable that the nation is in no sense as imperialistic as Rome was; and yet the blending of the apparently antagonistic principles of Imperialism and Separatism might be an easy task for English statesmen, if only our unnatural interpretation of a religious brotherhood could be given up, according to which racial and other differences shall be ignored in this world, and competitions and inter-marriages of dissimilar strains of human beings encouraged. If carried to extremes this doctrine would lead Englishmen, who certainly have always shown a real love for the brute creation, to

be content to sleep in pigsties and to eat like dogs. Should not the apparently natural race pride of thoroughbreds be taken into account and encouraged? Is not *esprit de corps* encouraged in each regiment of an army and yet the whole can be made to work in harmony? The necessity for a reasonable working basis is acutely felt in this great Empire where Anglo-Saxons, Scotch, Irish, Africans, Hindoos, Chinese and their social subdivisions are all in close touch with each other; they certainly feel pride in being called Britons, but they have a wish to retain their distinctive characteristics, and emphasise this by their joint contempt for nondescript blendings and would resent as insulting remarks that they have been contaminated by foreign races.

When one contemplates the marvellous harmony with which the various human organs work together, especially in youth, and how a trace of poison sets them all at cross purposes, one cannot help placing the constructive statesman, the harmoniser of the national constitution on a level not far removed from that power, Evolution by name, which has created harmonious life; and to assigning to the disorganisers, the creators of strife and class hatred, the position of political poisons. They have never earned for themselves lasting historical praise. The ancient example of Alcibiades has had imitators in all ages. Defeated in politics by a political clique, he decided on amputating that particular limb, even at the risk of the life of the state. He pointed out to the Spartans the weak spot of the Athenian home defence and the desirability of sending support to the Syracusians, then at war with his political opponents, with his own town. The result, as everyone knows, was the end of the glory of Athens. Generally such actions are considered treasonable, but in England members of Parliament and would-be leaders of public thought are known to have drunk success to enemies when these had beaten us in battle. They saw in an outside enemy merely an ally who was injuring a political oppo-

nent. Men who are incapable of dominating the larger state very generally strive to detach a portion, and by setting interest against interest, create strife. To rulers with lofty state aims, such poisonous influences and the internal strife out of which they grow, must naturally seem legitimate objects for attack, and when, as often happens, harmonising influences either fail or work too slowly for their originators, the self-ordained surgeon attempts amputation, yet the very knife which he has to employ is a state within a state, or rather, he has no knife but he sets the teeth of the nation, one of its castes or interests, to gnaw out the cancerous growth. This in itself is an accentuation of the evil, an increased discord between two organs of the body politic, between two minor states or between castes or interests. Few men have perhaps had a loftier state ideal than Philip II. of Spain. His nations were to be harmonised by means of religion, the heretics were to be amputated by the religious caste, a bone-cutting saw. In France the process was a slower one, the unification of statelets which was commenced by Louis XIV. led to the predominance of the landed aristocracy, and to a strife with the rest of the people which ended in the Revolution. These, and many previous warning examples, rather than the unification idea, have led to the growth of constitutionally designed states, but looking at the Greek townlets or the larger modern democracies, it is felt that their everlasting internal frictions which absorb all surplus state energy are the causes of the want of such lofty state tendencies as are to be found amongst the old Romans. These few remarks will, it is hoped have clothed states with the personal character which they should possess if their actions are to be considered from the ethical standpoint here adopted.

As regards the suggestion that state tendencies take the place of personal instincts, it may be mentioned that if a number of individuals who have the same, or nearly the

same strongly marked characteristics or instincts, combine to form a state, that particular instinct will appear as a state tendency, will form part of the soul of the people. The feudal aristocracy was selected from amongst the general population because of the fighting instinct of its individuals, and naturally that caste figured in history as one with a quarrelsome, overbearing and fighting tendency against which the French Revolution was a drastic protest. Individual Scotchmen are shrewd, individual Irishmen are spendthrifts, individual Jews have a money-making instinct, the Assyrians were bloodthirsty; Fielding Hall in his "Soul of a People" draws attention to the fact that the tendencies in Europeans of domineering over others and of being content to serve, are in the Burmese replaced by a love of independence and disinclination either to be interfered with or to interfere with others, and that this tendency is so common there that it is practically a state tendency or instinct. The state tendencies of these tribes, castes and nations are reflections of the personal instincts of the people.

Not infrequently state tendencies correspond more nearly to the average acquired instincts, to the national accomplishments. These are created by education, just as human accomplishments are created by mental and nervous efforts. Thus the Jewish and the Mohammedan state tendency to act as if they were the salt of the earth, is the after effect of the teaching, which in ancient days was so prevalent around the Persian Gulf and the Mediterranean, that each tribe and each nation had a patron god. Homer's songs were educational efforts which created the state tendencies of the Greek townlets, and the state tendencies of Rome are based on the legends of its foundation. Naturally, therefore, religions, being educational powers, have always created strong state tendencies, and naturally statesmen of all ages have used religious teachings to produce some desired state tendency, though often the results have not been in harmony with expectations.

As a curiosity amongst the tendencies of minor states may be mentioned the re-invention by Louis XIV. of the state idea, "plaire au roi." The paralysing effects of the latter-day Roman state trading efforts had after a lapse of 1,000 years gradually been balanced. Trade and industry were again taken up by individuals, and gold and silver, which during the decline of Rome had been almost absolutely drained away to the East, or was used only for hoarding purposes, gradually began to reappear, and many transactions which only a hundred years earlier would have been impossible, were freely indulged in. Money was practically a new commodity, and it is one of the greatest merits of Louis XIV. that, uneducated as he was, he felt, for he can hardly be said to have had a clear idea on the subject, that money could be employed to unify his kingdom. Instead of rewarding his nobility with feudal powers, which more often than not were turned against the overlord, he, much to the dismay of Colbert, started a wholesale system of pensioning those who agreed to live at Court, and as this did not have the desired effect, he even invented modern hospitality. A nobleman, instead of as heretofore being provided with bare rooms in the King's palace, for which furniture and household goods and even provisions had to be carted over hundreds of miles of execrable roads, was from then to be entertained in the new palace at Versailles, in beautifully furnished rooms and at sumptuous tables, and, not content even with these efforts, the king and princes danced on the stage to please, attract and refine their guests. Everything was done to draw the truculent nobility away from their feudal strongholds towards the court and under the eye and influence of their king. It was under this fairy-like transformation scene, and before the nobility had grasped the meaning that "money is power" that the grand monarch was teaching the lesson that there should be but one object in life, "plaire au roi." Only those who could please the king could hope for what, at the

time, seemed like superlative favours. This teaching rapidly crystallised into a state tendency amongst the nobility not only of France but of all Europe, and the truly marvellous influence which it exercised has never been better illustrated than in England where the devotion of the English nobility to the Stuarts, an alien set of kings and pretenders, who have rarely been surpassed for weakness of intellect and depravity of character, is a marvel to all students of history. During the long years which followed their overthrow they betrayed their followers in every conceivable way, but the state tendency amongst the nobility was proof against everything, it had become an accomplishment, an acquired instinct. They did what the king wished, for he had to be pleased. Marlborough was, in a way, the first to grasp the fact that the newly created power of wealth was a power superior to that of kings. Through the fortune which he amassed he ruled his sovereign with an iron hand. "Plaire au roi" has now given way to the state tendency "get money, honestly if you can, but get money," but those who grow hoarse on this cry should go for instruction to the temple of Juno Moneta.

There are other tendencies of minor states which may have been or may still be equally strong, but they have not gone through such a picturesque trial. That they are likely to be tenacious of life is evident when the countless persecutions of religious and political sects are recalled. Apparently, there is only one means of modifying such state tendencies and that is to employ the means which first of all created them: education. Education is the reasoning process of a state, and just as reason should guide the personal instincts amongst the edifices of civilisation, so education should guide state tendencies amongst the labyrinth of state powers.

A perfect life has here been defined as one in which instincts and reason work in harmony, and in which the instincts are the guides in the domain of nature and come

under the control of reason only where they would come in conflict with reason's creation: civilisation. If then the analogy here adopted holds good, a perfect state should be one in which education merely controls and harmonises state tendencies and sub-states, but does not attempt to crush or exaggerate them.

EDUCATION, OR, STATE THINKING.

The object of this chapter is to illustrate, if possible, that the educational systems of states are their intellectual mechanisms, that in the same way as the brain can grapple with problems and arrive at definite conclusions with regard to them, so also can educational systems grapple with national matters and lead the nation to act towards them along definite lines. It has been shown that personal accomplishments are acquired by reasoning processes and are then handed over to the instinct department. Similarly it would appear that educational efforts produce tendencies in nations which are of the nature of acquired national instincts or accomplishments, and these are perpetuated by continuous classical education. Educational systems therefore may seem to occupy the position not only of reason in the individual but also of memory. When whole nations learn by heart prayers in dead and incomprehensible languages, dogmas of past ages, and when they are trained to believe and to act what the ancients perhaps only imagined, when in fact they devote themselves to classics, as is very largely the practice in Europe and the exclusive practice in China, then the educational system has reduced its functions to those of the instinct ganglia in individuals.

Seeing that the education of the state is accomplished through the education of the individual, attention must here be drawn to the distinction that the education which may be of advantage to an individual, either because it places him on the same level as other individuals or because it gives him certain advantages over them, will not necessarily be advantageous to the state as a whole. This will be better understood by assuming, as is generally

true, that it is an advantage to an individual to be highly accomplished, which means that the memory gifts of the individual shall have been improved or intensified. But a nation consisting of individuals trained on these lines will merely remember and not reason, it will steadfastly adhere to its ancient traditions, and in cases of danger and emergency will be unable to reason either rapidly or correctly. Then again under certain conditions, the cultivation of the reasoning power of the individual is advantageous to him, for it makes him resourceful in all dealings with his neighbours, but a nation of philosophers which is easily swayed by educational efforts will either be, or will appear to be, a very unsteady one. On account of this complication the effect of educational systems on the state will as far as possible be treated independently of the education of the individual who will be referred to merely for purposes of illustration. The two effects overlap in the case of kings and leaders of thought, because very often a king is "the State," and great men generally affect the thoughts of contemporary and future generations. It will, however, first be necessary to establish, if this be possible, that education is the thinking process of a nation.

The most striking experience with regard to the reasoning processes of states or of large communities is their slowness. Thus in comparatively recent days it took Cobden practically one generation to convert England from uncertain views, to Free Trade principles, and it took his followers another generation to convert his elastic teachings into the more dogmatic ones of to-day. A still slower educational process extending over two, if not three generations, was that started by the reform bills of 1837 and 1868, for it is only now that the working classes, who forty years ago gained the franchise, are grasping part of the power which this change gave them. The same phenomenon of the slowness of the reasoning process of nations is manifest to all careful students of history,

though to the popular mind the perspective of time makes cause and effect to appear almost simultaneously. What was the cause of the French Revolution? Not the teachings of any living individual, not of Danton, nor of Robespierre, who were merely individuals in whom the newly created state fury was most markedly developed. Voltaire and J. J. Rousseau were the men who, in the previous generation, had educated France into adopting the shibboleth of "liberty, equality, and fraternity." It was not the first teachers of the idea and their own generation who struggled, suffered, and then made others suffer, it was the collective effort of their education on the children of the next generation which led to the upheaval.

Great national events and especially national calamities are educators of states, and history recounts many series of efforts of nations which have followed each other at intervals of thirty and forty years. The revenge for Waterloo was the cherished dream of two if not three successive generations of Frenchmen. Then also everybody expected a new struggle between France and Germany to break out thirty years after Sedan. Nearly all great national events have proceeded in jerks. The history of Rome is full of them, but conspicuous over the rest are the Marian troubles which started with the defeat of the invading Kimbers and Teutons; they led step by step in generation after generation to the establishment of Cæsarism. The Reformation too was of this nature. Wycliffe, Huss, the Hussite wars, and Luther followed each other at intervals of about two, one and three generations.

What is the explanation of this phenomenon? Apparently grown up people, sad though it may sound, cannot learn, cannot educate themselves, and it seems almost as if the power of learning is possessed only by children and young people. By the time that these have grown to man's estate, that is by the time that they enter the state either as voters or as armed multitudes, their collective

ideas make themselves felt as state tendencies, but by that time the individuals have lost the power of learning. This is an assertion which probably will be stoutly denied by most grown up people. At first the denial will be unqualified, then perhaps each individual will deny the assertion as regards himself, but will admit that his or her friends certainly do seem to be incapable of adopting good advice or of learning by example or experience, and that the rest of mankind are of the same mould. Carlyle expressed a more general view when he said that each man looked on all other men as being fools and that the opinion of the majority was about right. It is not necessary here to convict each reader of having lost his power of learning, it will suffice if he admit that his friends and the rest of mankind will not, or cannot learn, for it is the majority which constitutes the multitude, "the State." There are exceptions, but they prove the rule. They are generally found amongst research workers. At any rate in England every boy is supposed to be born either a Radical or a Unionist, which means that the nursery and school influences are supposed to reign supreme in after life. It is the same with regard to religious views, and the heat which is engendered in political circles whenever the question of religious teaching in schools is raised, is due to the instinctive feeling, that if a child is allowed to remain under a particular religious influence, up to say its tenth year, then its religious conviction is settled for life. When grown up it may join other denominations, or become an Atheist or Idealist, but generally speaking such a person will, in old age, revert to its nursery principles and die in the faith in which it first learned to pray for its mother and father and kind friends.

As already said, any person above thirty years of age will stoutly deny that he has left off learning. How is it then that after reaching this age, when the necessity for learning modern languages in place of Greek and

Latin makes itself strongly felt in almost every walk of life, very few people even attempt to go through a new educational process? How is it that now, when to many men it is of prime importance to understand women, they give up the task of studying them with the lame excuse that women are incomprehensible? Why is it that religious and political subjects are tabooed in polite society, which of course consists of people of over thirty years of age? Evidently for no other reason than that men do not want to be educated in these subjects. Their views have grown to be acquired instincts, accomplishments which have to be maintained at a high state of perfection. Preachers and editors of papers representing the views which one has already assimilated, are listened to weekly or daily, just as a professional musician practises a particular instrument for a certain number of hours each day. If an important state question arises, people do not think it out but listen in breathless expectation to what their political leader or religious guide may say, and then finding that all their friends, who have naturally also heard or read the same remarks, are of the same opinion, they fondly imagine that they have most carefully done all the thinking.

It must, however, be admitted that there are excuses for what looks like mental laziness. A medical professor once remarked to his class, who had caught him blundering, "You have just learnt the newest pharmacopœia by heart and may laugh at me for a slip, but remember it is the fourth one which I have had to learn, and not only that, but I have had to unlearn three older ones." Here he touched on one of the great difficulties: Unlearning. At school, boys unlearn or try to unlearn what has been taught in the nursery; at College the student tries to unlearn his schooling, and in after life experience forces men to unlearn what they have previously acquired. The methods of learning may survive, and fortunate are they who have acquired good methods, for then they can, if they

like, always learn, and then even as octogenarians they will be the highest authorities on the bearings of the latest discoveries; but the bad systems of learning which are now practised, make it difficult if not impossible for most people to acquire knowledge in after life.

Clearly there is more in the method of education than in its matter. The former may be either of a classical nature or of the nature of research work, it may train the brain to remember or to reason and it flavours almost of a combined immorality and crime that the brain which is, or should be, capable of both processes is generally forced to exaggerate the one and crush the other; for classical education exaggerates the childish powers of memory and hinders the reasoning powers of maturer years from developing.

States, or rather state regulations, may influence these methods, as exemplified in China. There every public office is attainable only by successful competitive examination in the classics, and as a consequence, the celestials are, as it were, asleep in Castle Indolent, protected by hoary classical briars and cobwebs against every outside influence. To a lesser degree the same may be said of every state, and of every state within a state, more especially where competitive examinations are the basis of advancement; so much so, that it is a relief to be reminded that benchers have still to gain advancement by eating dinners.

Examinations, if necessary at all, should be as regards mental capabilities, what mechanical tests should be as regards properties of materials. Neither should be slavish copies of working conditions. The appearance of a fractured piece of metal reveals more than a careful measurement of tenacity, yet strength is one of the cherished properties of metals. Then, too, the colour of a little furnace slag is generally a better indication of the completion of the smelting process than is a view of the molten metal. The egg-laying qualities of Spanish fowls

are revealed by the redness or otherwise of their combs. A foal which will grow up to be a white horse is known by the blackness of its coat. Similarly examinations should be devised not towards ascertaining what condition a boy is in, but what sort of a man he will grow to be. Unfortunately the tendency is a strong one to judge materials by convenient test conditions and also to arrange examinations of boys to suit the conditions to which examiners have attained. That materials for shipbuilding should be light, preferably of the nature of cork, was a view held in shipping circles even when iron was first introduced, and nowadays armchair engineers attach more importance to the measurable tenacity of materials than to reliability qualities, which cannot be expressed in numbers. When poultry judges had once fixed on the colour of combs for an egg-laying test, a Spanish breed was soon evolved which had superlatively red combs but laid no eggs. The tendency amongst examiners will always be to arrange their tests so as to be able to judge decisively, not what the boy will be but what he is, and as tests for reasoning powers are not easy to devise, a premium is placed on memory, which, while it is a gift of children, more often than not is also a sign of weak reasoning power. Unfortunately reason, where it does exist, is strongly repressed to please examiners, who have not got a test for detecting quick and correct reasoning brains.

How difficult it is to guard even the most practical systems against classical degeneration and putrefaction, is illustrated by the Cambridge Tripos examinations and the entrance examinations for boys into the navy. At Cambridge, as at all old universities, disputations or wranglings were arranged for, and the best all round men would show to advantage and gain their degrees. Unfortunately, scholarships and fellowships were founded for the benefit of the best men, and the pecuniary interests which were thus introduced led to favouritism and the

wrangling system which discovered the man and the thinker, gave way to the classical examination system which discovered the cram, the mere memory machine. The same process is going on with regard to the naval examinations. The Admiralty had hit on the very sensible plan of cross-examining boys on odd subjects which were not likely to be crammed into them at school. They wished to pick out quick and observant boys, but no sooner did this become known than preparatory schools crammed their boys with the oddest rubbish imaginable. They have to know the colours of locomotives and steamers, house flags and funnels, the names which are represented by detached letters, such as P. & O., Y.M.C.A., A.D.C., etc., also the names of cricket and football celebrities and secretaries, notorious criminals and cabinet ministers, pantomime stories and the contents of celebrated novels. They have to express opinions about canals of Mars, polar controversies and comets, etc., etc. It is the same old story, cram the boy who has a memory and let the thinking boy wreck his brain or do his learning after school days and amongst bitter experiences.

What is the process of learning in the individual? Very young children learn by the same process that parrots learn. It is of no use making them repeat single words of the sentence which is to be learnt, it is the whole of Strubel Peter which they love to hear over and over again and which they learn to remember word for word, probably, too, without understanding it. This form of memory survives up to old age in public orators, in great musicians and in lawyers. They hear a tune or read a speech and they remember it as a whole. Their brain matter, as Schopenhauer suggests, having been folded in a particular way, will, when required, refold itself along the same creases. When a babe grows to be a child this passive form of memory generally weakens and is replaced by a more active one. Thus a boy carries out the movements necessary for throwing stones, shooting arrows, etc.,

until he attains perfection. He thus trains the brain and nervous matter to go through active processes which are improved by repetition. He acquires accomplishments, but not only that, he familiarises his nervous system with a process of research learning which is improved every time that a new subject presents itself. On the first occasion of trying to throw a stone, it probably does not leave the boy's hand. Subsequently when he has learnt to open his hand, the stone may fly anywhere and the child waits open-mouthed to hear the crash. It is only very gradually that he associates the opening of the hand with flight in a particular direction, and then of course he is learning to aim. No one would suggest letting a child learn to fire a revolver or even to use a sling before it can throw a stone, for aimless shooting even by a child is dangerous. It is only when the child has discovered its own power of how to learn the process of directing the flight of one projectile that the learning of the more complicated process is advisable. The throwing of a stone differs almost entirely from the child's method of learning by heart, but resembles to a certain extent the methods of remembering employed by most grown up people. They generally do not listen, as a child listens, to a string of words and then reproduce them, they speak aloud the words to be learnt, and what they really remember is not so much the ideas of the sentences they hear, as the activity of their tongue, or in some cases of their brain. Similarly, in stone throwing, a boy learns to remember the activity of his arm and fingers. In addition, and this is an important point, the nervous efforts associated with the learning of stone throwing is of the nature of research work. Without being able to express the matter in words the boy has discovered for himself that the flight of a stone can be directed, and that there is a something in nature which draws it downwards and curves its path. Herein lies the great advantage of all practical training. It is a primitive form of research education into the laws

of nature, into the manifestations of energy. Truths are thereby imparted which cannot be conveyed by such an imperfect instrument as language. Boys who have not learnt to throw or shoot may in after life be taught out of books how a stone would move if thrown, but this will not teach them to throw, how to move their arms and wrists, when to open the hand, etc., nor will they feel that what they are learning is any better than other classical dogmas, of which even at school they soon feel that it really does not matter whether they are true to nature or not, provided only that they help in getting through an examination. They may swear by Aristotle and argue on his assumption that heavy bodies fall more rapidly than light ones, or they may believe in Newton or others who state that weight does not affect the rate of fall. They cannot throw a stone, they can merely deal with the question by classical arguments.

It thus appears that there are two methods of education, the classical or learning by heart method and research education. The first of these methods treats the brain as if it were a storehouse capable of holding a number of facts and especially words, and it arranges these with varying degrees of excellence for the purpose of finding them when required. The other method looks on the brain as being a complicated mechanism in which structural adjustments are possible, especially in youth, and that with this mechanism, when perfected, definite processes of reasoning can be carried out with varying degrees of correctness and rapidity. Instead of using the available brain matter for the construction of rows and rows of pigeon holes, the boy who learns to reason is using the same matter in the construction of mechanism with which to carry out reasoning processes.

Classical education might be defined as being an accentuation of the gift of children for word memory, combined with a deliberate crushing of the thinking powers when these appear. Classical education is also of

the nature of an accomplishment, an acquired instinct, and like all instincts its working is an unconscious one. Those who labour under its influence believe with absolute honesty that they are above the weakness of not using their reason, yet they will admit that they regulate most of their actions on strict principles, codes of honour, etc. But principles, whether they have been learnt by heart in the nursery, at school, or in the caste in which one lives, are merely classics, they are remembrances of what others have done under certain circumstances, and when these or similar circumstances confront a man who has a well stored memory, he is relieved of the trouble of thinking if only he can in time remember the principle which is applicable to the particular case. Like lovers who, while labouring under the love instinct, stoutly deny their servitude, so also do the classically trained individuals proclaim that all their actions are reasoned, and whenever they have acted rapidly and without a moment's thought on old established principles, which may or may not suit the case, they will, if required, produce a string of arguments, just as if these had been laboriously gone through before the action. They behave like a person who has had a dream. A momentary shock which woke him seems in his brain to conjure up a string of semi-plausible events which led up to what is now depicted as a dreamland catastrophe. The tendency to go into the details of the reasons which led to certain actions is also common amongst effeminate men and more particularly amongst women, who act instinctively and often correctly, but think, or rather talk, afterwards. Both sets of individuals are prone to say, "I told you so," and they emphasise this remark by mentioning a string of reasons which present themselves after the event, but which they could not have produced a moment earlier.

It is therefore quite useless to expect that philosophers and scribes, in whose eyes word learning is the highest achievement of mankind, should for a moment

admit that true reason and even instinct are the equals if not the superiors of memory. They will not admit that Pallas Athena, like Venus Aphrodite changed her character when she entered towns. Starting as the goddess of liberal minded research and of wisdom the Athenians soon dressed her up in the garb of classical speculation and orthodoxy, because learning, not wisdom, is the natural tendency of crowded and idle communities such as are to be found in our old universities.

Classical systems, as a rule, are the reverse of research systems. The latter are like pyramids erected upon broad bases of millions of facts and culminating, if the buildings be carried high enough, in all-embracing ideas, whereas the classical system is like a spinning top, its base is a point, a word, an idea or a restriction, like Joshua's figurative remark about the sun and moon, and Euclid's decision to exclude from geometry all but straight lines and circles. The vast superstructures which are built up on such simple ideas by expansion, interpretation and re-interpretation are called classical systems. It is really wonderful what can be done in this respect with words, even more wonderful than that a top can be made to stand on a point, but it should not be forgotten that this is only possible by perpetual lashings of the whip. Classical systems cannot stand for ever as pyramids do, they have to be kept going, or the great natural truths would soon upset them. It is on this bolstering up process that classically inclined people spend their time and energy.

Let it not be imagined that even if every trace of classical writing were swept away, which would certainly be a great calamity, new systems would not spring up; in fact, new as modern sciences are, and powerful as is the influence of modern research in upsetting the various speculative spinning tops, some have already acquired enormous dimensions, and like the ancient distaff are spinning away on a single point and adding to their

weight by a constantly lengthening thread of corroborative investigations and speculations.

Some ancient men successively suggested that every thing had been made from air, or from water, or from earth, and the successive generations of philosophers lovingly expanded these systems till they upset themselves. Modern views about matter are apparently following the same course. Newton, the discoverer of attraction across space, possibly out of a nervous fear of going too far, said that action at a distance was difficult to conceive. This remark has been interpreted to mean that there is no action at a distance. John Dalton gave the world the theory of molecular equivalency or proportionality, which has now been petrified into a dogma that matter is not continuous but consists of molecules or atoms. These two ideas are the basis on which the whole modern conception of matter has been built up. The process has been an ingenious one and a bold one. Speculators were not deterred by the fact that beautiful mathematical investigations into collisions have not even yet been confirmed by experiments; they boldly invented ideally elastic collisions for molecules. It did not disturb them that some impalpable powders, like flour, are so full of friction that they can be made to stand up in small precipices if cut into, they ignored such facts and maintained that water and air are also powders composed of still finer particles than flour. It soon appeared that if there was to be no action at a distance, molecules could not be drawn together, could not collide, could not produce pressure, and solids, which are also said to be granular, could not hold together. To meet these difficulties another bold step was taken by asserting that there is a universal medium called ether. In order to explain many phenomena it was found necessary to assert that this ether exerted a pressure of millions of pounds per square inch. At first this medium was a continuous one, but substanceless, which sounds very much like nonsense. Then it was

demonstrated, by words of course, to be a solid which permitted things to move freely through it, which sounds still more absurd. Certainly such a solid is not a solid as understood by the public. What is to contain this ether? and where does the pressure come from which in turn holds it together? Practical men would say the universe must be surrounded by a large boiler shell of infinite strength, but this is impossible. To meet this difficulty modern speculators shifted their ground and proved, again by words, that ether like matter is also of a granular structure, that it is the real substance and that matter is merely the empty space between the ether grains. This is quite evident, at least to those who have swallowed the previous dogmas, though to others it sounds like unadulterated nonsense, but may be understandable by those who can stand on their heads and see things as they are not. It certainly does not help towards an understanding of all the observed phenomena, and therefore, as everyone knows, electrons have now been added to the stock of unknowable things. They are invisibly small, their sizes as compared with those of the atoms being as microbes to human bodies, but they are endowed with very virulent qualities. They and not the atoms are the custodians of energy, which, for their special benefit, is now negative electricity. What had become of the positive electricity no one knew until it was discovered hidden away in the centres of molecules like yolks in eggs. Strange to say negative electricity is allowed to act at a distance, at any rate for the present, and that is how the universe is now held together. Matter so it is said, does not act at a distance, for Newton had his doubts, but electricity has this power. Soon another bold man will apply Newton's doubts to electrons and then still smaller bodies will have to be invented with which to bombard the others and keep them in their place, in fact certain electron difficulties have already led to the introduction of a new time in which age is not measured by time alone

but also by velocity. These theories may convey a faint idea of what is meant by Kant's expression: transcendental.

Will any man ever dare to shake this modern system? Will he, like Kepler, have the patience, the gift and the power to explain the laws of nature by other means than the present ones? Have not the thousands of repeated experiments been made, not only to find the truth, but to prove modern speculations to be correct and thus to earn a doctor's hat or a higher distinction? Possibly everything is as stated, fluids may be granular, there may be electrons, but why, in this research age, adopt the classical method of starting from the hesitating expressions of great authorities like Newton and Dalton? Why not draw these or other conclusions from the pile of ever accumulating facts? If—as was done by Euclid—a start be made with the restriction that only straight lines and circles are perfect geometrical forms, then, so the ancients said, because stars are perfect, they must move in circles, but as that was clearly not the case classical wheels had to be put within wheels to convert circles into cycloids, until these resemble ellipses, but were not of their nature. Similarly, if a start be made by postulating atoms and perfectly elastic collisions and by barring action at a distance, one will not of necessity arrive at the truth and one may hamper its discovery.

Classical training is, as has frequently been stated, largely due to competitive examinations. Assume the following simple case. A candidate is asked to draw a straight line. Nothing is easier; he takes a ruler and pencil and draws a straight line and there it is. But, says the examiner, suppose that the so-called ruler is not straight what then? The simple answer is to draw two lines with the crooked ruler reversed and to find a mean line between the two. Right again. But suppose that there is no straight edge available, but only bits of metal, wood or cardboard with which to make links. The

answer will be a number of wonderful mechanical link arrangements which, with more or less accuracy, do draw straight lines. These wonderful link arrangements will commend themselves to the examiner and henceforth scholars, proud of their learning, will in and out of examinations employ any complication having long names rather than the simple ruler. They will thus prove to the examiner that they have learnt a lot, and to the practical draughtsman that they are unmitigated fools, who would use complications when simple devices are ready to hand.

It is only necessary to read a text book on kinematics to see that this is not an imaginary example, but there is no difficulty in finding others, even in arithmetic. Everybody knows or should know how to work long multiplication sums, and if he were to be examined on the subject he would have to be able to show the whole process even if he has the gift of knowing what the result is. He may not adopt any simpler method in which the answer appears without working out. Let the problem be the multiplying of 36 by 23. The school method is to write these two values one above the other, and below these to write down in two lines the multiple of three times thirty-six, and of twenty times thirty-six and then to add these, the sum being the required product. The size of the sum increases as the square of the number of figures to be multiplied, and soon grows to be very clumsy. A much simpler and quicker method is cross multiplication, which, because boys would at once do it mentally and not exhibit the elaborate process, so dear to examiners, is not taught at schools. Three times six is eighteen, put down eight and carry one. Twice six is twelve, three times three is nine, which products added to one make twenty-two. The last two right hand figures of the result are therefore twenty-eight, while two has to be carried to the further product of three times two to make eight. Thus the product is 828, and almost any child could learn to do such sums mentally.

Similar remarks apply to the extraction of the square root, which is done on the basis of a well known formula $a^2+2ab+b^2$. The value of a, is first assumed, then b is found approximately and added to a, and the process is repeated which rapidly leads to huge sums. The other method, probably because it is the simpler one, is never taught. $(a+b)\times(a-b)=a^2-b^2$. As in the above case a value has to be assumed either for $(a+b)$ or $(a-b)$, then find b^2 approximately by division, subtraction, halving, and squaring. Subtract b^2 thus found from the number whose root is to be found, divide again and take the mean of divisor and dividend. If desired, repeat the operation, once or several times, using the newly found value of $(a+b)$ or $(a-b)$, to find successive values of b^2. Thus in a few steps a very correct answer is arrived at. This process, like cross multiplication, can also be carried out mentally on small numbers, and is, therefore, not suitable for school book exercises. Another rapid method, but one not suited for mental work, is to take the mean of the divisor and dividend, to use this as a divisor and to repeat the division until the two are practically equal, but this process is rather clumsy.

The efforts which are now being made to improve Euclid out of existence, indicate that even classical mathematicians are gradually educating themselves into teaching how to facilitate and expedite the thinking process in children. What can be done in this direction may be exemplified by the 47th proposition, which, though it is one of the corner-stones of mathematics, is probably at once forgotten by 99 out of 100 boys when they leave school. They were not allowed to grasp the essence of the proposition because Euclid had decided that it should be reached by 46 clumsy steps, and because examiners looked on the proving of this proposition as a proof that these 46 steps had been taken. It has also to be remembered that arithmetic with Roman, Greek, or even with Chaldean numerals was a most clumsy proceeding in

Euclid's days, and proportion or the rule of three which is so simple with Arabic numerals used by us, was by the Greeks, with their literary numerals avoided as much as possible. The correctness of the 47th proposition can be made clear to anyone, especially if stated in the form that the areas of the two similar triangles erected on the sides of a right angled triangle are equal to the area of another similar triangle erected on the hypotenuse. It is only necessary to surround the right angled triangle with a rectangle whose upper parallel touches the right angled corner. Then the area of this rectangle is double the area of the triangle, which can easily be made apparent by dropping a perpendicular. In addition to the original triangle there are now two external ones, similar to it, and the sum of their areas is, of course, equal to that of the original. To extend this proof to squares, one would have to be able to grasp the simple idea of proportions, of which as suggested, the Greek philosophers were not exactly incapable, but of which they fought shy on account of the difficulty of working any sums even the simple rule of three in their numerical systems. How, for instance, could a Roman work out the simple multiplication sum of $29 \times 34 = 986$, which even our schoolboys of to-day would do mentally if allowed to do cross multiplication. The Roman notations for these three values are XXIX, XXXIV, and CMLXXXVI. The Greek notation, clearly a makeshift of literary men, was equally impracticable, all the twenty-four letters of their alphabet being used for the units, tens, and a few of the hundreds. The Babylonian system was more practical, one of the units or ten signs placed before a hundred sign indicating multiplication, thus 3.100 would mean 300, but addition if placed behind and 100.3 would mean 103. Of course schoolmasters will say that roundabout methods are necessary for training purposes, yet no one trains himself for a running match by complicated waltzing, nor for long jumps by turning somersaults. Form and style are

everything in the eyes of some, and one has to conform to their complicated rules, but for purposes of clear and rapid thinking and acting, too much complication in the methods of training must always remain objectionable. It is regrettable that the late Mr. Bidder, the calculating boy of the Victorian age, was never able to explain the mental process by which he knew as it were without thinking the results of complicated calculation. His published explanation as to how he could mentally calculate the logarithm of any number up to the eighth decimal gives no assistance in this respect.

The fact seems to be that in all ages scholastics, whose business it is to study the art of expressing things, are permanently disabled by their training from dealing with the things themselves, and they are naturally recruited from amongst those who suffer from the female trait of being unable to invent. They will rather labour under the most complicated conditions than brush aside established processes and build up new ones.

This defect of literary men accounts no doubt for the marvellous complication of their tools, which are the languages with which they work, the most glaring case being English Orthography. Apparently primitive writings, those of the old Egyptians, the present Chinese, and of the North, Middle, and South American Indians recorded only subjects, as is the case as regards our numerals, which can of course be read in any language. Alphabets for recording sounds are of comparatively recent origin. In China sound signs are tacked on to the subject signs which latter are understood independently of the former. Modern writing proper records only the sounds, sometimes only the consonants, as in the older Hebrew texts, but more generally both consonants and vowels. The sound signs, *i.e.*, the letters, are necessarily quite arbitrary in shape, and have been adapted to the available writing material and changed when it changed. The cuneiform characters were evidently best suited for

moist clay tablets, but, as soon as the more rapid method of scratching papyrus leaves was invented, the Babylonian writing died out. Paper, pen, and ink have not effected any radical change since then, and even the invention of printing left things as they were, though it would have been easy to have reverted to a system similar to the cuneiform.

The desire to expedite writing led many men, Rich in 1645 being the first, to invent about 300 different systems of shorthand, in which each sound is denoted, not by a complicated letter, but by a single straight, curved long or short line; but even now these outside efforts have not been accepted by literary men, who prefer to denote the sound M by nine straight and curved lines where one would suffice. This conservative tendency is stronger in England than in any other country, as is evident from the fact that although Englishmen daily utter about 50 different sounds, of which 25 are consonants not including gutturals, and 25 vowels, they have stedfastly refused to follow foreign examples by increasing the number of letters in their alphabet from that which sufficed for the needs of the ancient Romans. The result is not only that some English letters have to do service for several sounds, but for some incomprehensible reason several sounds have each to be expressed by several letters. There are, for instance, 360 pronounceable ways of spelling "coffee." It it claimed that this exquisite complication helps one to ascertain the derivations of words, but is there one in a million who when he says that he has had "enough," cares to know that the word is related to the German "genug"? Scholars could easily trace these connections without the help of our complicated spelling, and they have really no right to inflict it on the man in the street who wants to understand things clearly and not in a mysteriously learned way. With 50 different sounds to be recorded, no alphabet which consists of only 29 letters, including th, sh, ch, can possibly hope to give satisfaction,

for if, as is now done in America, a few letters are definitely assigned to an equal number of definite sounds, the disproportion between the remaining sounds and the reduced number of available letters is only increased. Possibly some practical man may one day tackle the question and devise a simple alphabet with which not only the 50 English sounds can be clearly recorded, but also additional vowels, gutturals, etc., which are to be found on the Continent, Scotland, and Wales, and perhaps even the clicks and other noises of some African tribes might be included. At any rate, using short, medium and long lines, both straight and curved in two senses, and slanting at say 6, 8, or 12 different angles, 54, 72, or 108 distinct signs are created, which with a little ingenuity could be so apportioned as to give a truly phonetic value to all writing, and perhaps make it possible, with the help of Grimm's law for Britons, Scandinavians, Germans, and Dutch to understand each others' literature without a preliminary study of their languages.

The mistake which inventors of shorthand systems seem to have made in the past is, that instead of increasing the number of available sound signs they have reduced them, and have thereby been forced into numerous complications which in the long run are far more difficult to learn than a longer alphabet would be. The same misdirected parsimony was the cause of the awkwardness of the Roman numerical notation. Nowadays four signs have to be used with which to denote the four numbers 1, 2, 3, 4. The Roman child had to remember only one sign which was repeated thus, I, II, III, IIII. He could record values up to 9 with the help of only two signs, I and V, and by adding a third sign, X, he could reach as far as 49, four signs would carry him to 99, which was perhaps all that the average Roman needed to trouble about. Our children have to go through the very dreadful ordeal of learning ten signs before they can record all the numbers up to ten, fortunately they are sufficiently gifted to be

able to do this by the time they are six or seven years old, but then as soon as they can grasp the idea of larger numbers they are fully equipped to deal with millions and with the smallest fractions, which, even to the most learned Greek and Roman, was an impossibility. It is the same with regard to alphabets, a set of letters, which probably more than sufficed for the few sounds which Roman tongues could pronounce, must necessarily lead to complications like those of English orthography if adapted by a people whose tongues have the ability and inclination to produce more than double that number of sounds.

In order still further to illustrate the practical disadvantage of classical methods, it should be recalled that Kepler said that it took him thirteen years to shake off the influence which classical teachings had on him, and that his discoveries were only possible after he had said to himself that what the classics had believed was not necessarily true. A still more instructive case is that of Newton's elaboration of higher mathematics. He never learnt Euclid, which to this day has remained our classic in the subject of mathematics, and when for the purpose of an examination he did look into this book, he gave utterance to the sentiment that he could not understand how anybody could trouble to write down such self-evident truths. Newton's mathematical education was clearly not carried out on the classical lines of his day, and it led him along the path of research to invent the system of fluxions. Leibnitz of Hanover invented the differential and integral calculus, which differed but slightly from Newton's system, but it had grown out of geometrical and not out of physical processes. Newton's fluxions were in England raised to the position of classics, but they were planted in uncongenial soil, for English boys were still compelled to wade through fossilised Euclidian methods in which nothing but circles and straight lines may be used, and a true feeling for analytical mathematics could

not in England come into existence. In fact, for 100 years after Newton, England produced no eminent mathematician, although the Continent, where Euclid was looked upon as being rather a curious collection of mathematical puzzles than as a school book, teemed with mathematicians of the highest eminence. It was not until Leibnitz's calculus was translated into English and had displaced Newton's fluxions, that England also produced mathematicians capable of advancing their science. Apparently the calculus is less interfered with than fluxions by a previous training in classical Euclid.

Teachers almost naturally establish standard methods: class books, classics, for they simplify the teaching enormously, especially if a classical training has long ago killed any longings which they may have possessed for research work, either original or for the purpose of verifying what they were taught to believe. Even Scientists suffer from this weakness, and teach largely out of books what great searchers have said, and if it so happens that Aristotle says that heavier bodies fall faster than light ones, then this is believed in for nearly 2,000 years until Galileo asked whether this was true and getting No! for answer, he paved the way for Newton's revelations of the nature of gravity.

Tendencies to make education classical have existed in all ages and have generally been temporarily successful, but rarely to the same extent as in ancient Egypt and in China, where the discoveries and attainments of one age were and are worshipped without enquiry by hundreds of successive generations, until they have gradually become crystallised into systems of classics of which some have attained to the rank of religion. Thus ancient views about cosmogony or the creation, and views about the structure of the universe which should be of no religious importance, have several times been made corner stones of national beliefs, and the faiths of some modern religious sects are merely the petrified scientific views of their

founders. Should classical tendencies prevail, there is a fair probability that a few thousand years hence religions will have come into being with compulsory beliefs in evolution, natural selection, conservation of energy, all pervading ether, electrons, etc. Possibly these ideas will have acquired the rank of deities, perhaps even their true meaning will have then been lost, as has been the case with many Sanscrit, Sumerian, and Latin words.

The tendency to make classics of subjects which were known or believed in by the ancients, is accompanied, especially in cultured nations, by a tendency to deify even the words which convey these ideas. The perfection of the art of speaking and writing gradually becomes the chief aim of all scholars, and not the ideas but the words in which they are conveyed, is the subject of deepest study, the form and not the substance is valued. It is the form which appeals to the multitudes, who clamour to be educated by the best talkers and these, unfortunately, are rarely men of research; they remember too easily to trouble to think, and are mere parrots repeating what they have learnt by heart, like Barristers instructed by their Solicitors. It is these men who in constitutional states rise to be leaders. These are men who have the gift of learning whole books by heart and who, therefore, are ever ready to meet a new fact, a new argument, or conclusion with a classical quotation. These men, if ever they had the inclination to think deeply, have long ago converted their brain into a storehouse of sentences, and in them the complicated machinery, which alone can carry out a correct reasoning process, has been scrapped, and delicate springs, spindles, wheels, and wires, intended for the reasoning mechanism, have been twisted, into binders for worthless sheaves of classical straw. No wonder, therefore, that the legal profession, although it is unquestionably one of the most artificial, has produced no great statesmen. Notable but not enviable exceptions are Lord Bacon and Robespierre. Lord Armstrong will

be claimed by the lawyers, but he was rather a failure in their profession, he was a born Engineer and a shrewd business man. Cicero, too, may be quoted, for he was an eminent man in his own line, and yet he was but a mere toy in the hands of leaders like Octavius and Anthony, being handed over by the one, though he was his friend, to the executioners of the other whom he had offended. He was a mere pawn in the game of the day and of less value than a centurion, who would not have been treated in this way. Amongst the peaceful professions both theologians and lawyers have had equal chances of showing their public talents; yet though the former have in all ages produced eminent statesmen and founders of religious sects and state religions, lawyers have never been statesmen, nor does it ever seem to have occurred to a single member of their profession to organise a state in which impartial justice should be the dominating principle. It was left to warriors and traders to erect temples to Juno Moneta, whereas her professed votaries, act more like robbers who strip pilgrims before allowing them to approach the goddess of justice.

Memory is of great advantage to the average individual, and a leader of men can hardly do without it, but such an individual is not a leader of thought if his reasoning mechanism is imperfect and if it has not been properly adjusted or if it has been allowed to rust. Men like Erasmus were professedly men of letters versed in classics but not creators of new ideas; new ideas came from men like Luther whose Latin was execrable.

In States, especially in constitutional states, the combined memory of the multitude, which is strongly encouraged by classical teaching, is a hindrance to progress, for the more perfect the remembrance, the more conservative the national tendency; and as the world moves on, state ideas are handed down unaltered from generation to generation till they become fossilised and have to be broken up like rocks whenever a national

calamity forces a people to use its reasoning powers. The most difficult part of this latter process, both in the nation and in the individual is the unlearning of what has been learnt, or in other words, to blot out one's classics.

Research workers of the past ages have had to wade through the classics, even Newton had to take holy orders before he was appointed Master of the Mint, but the public are feeling more and more clearly, and this is part of the modern process of education, that eminence, except in the Church and at the Bar, may and should now be attainable without classical training. Even the Church is favouring research, and soon perhaps only lawyers will be able to dispense with thinking faculties.

To a certain extent the word classics is intentionally associated with Greek and Latin writers; in reality, classics embrace all stereotyped class books and it is here extended to embrace over-training the memory. Sooner or later all teachers find out that their boys pass their examinations more easily if books are learnt by heart, and any examination system which encourages this tendency is evidently a factor which will hamper the reasoning development of a nation. Memory alone is not reasoning power, and for a nation to live or try to live the lives of its fathers, or worse still of classical personages of foreign lands, is to curtail its tendency towards progress.

People who have not been crammed with classics, who do not know, as Faust's Wagner thought he did, all that others had known before, people who like Newton, Galileo, Mohr, Dalton, Joule, Darwin, were amateurs in the sciences which they reformed, were in a sense driven to think, for they did not know all that might be known and they had to find out what things were. Lord Rayleigh is said to have remarked about Bell, that he would never have invented the telephone had he known all that was known about sound. Not being versed in the classics of acoustics, and because he did not know by heart what others had

done, he had to think. He did not know that his idea had been tried many years ago in Manchester and failed there.

Mohr was an apothecary by trade, but dabbling in physics he managed to be the first to enunciate the great truth about the conservation of energy. Joule, who established this law, was a Manchester manufacturer and not versed in classical science. John Dalton was a Manchester schoolmaster, but he grasped what no authority on chemistry had grasped before him, the great principle of molecular equivalence. Even in military matters, Clive, an office clerk, is found emulating Alexander the Great; Wellington, who had received a most un-English, unclassical education on the Continent, is seen standing up to Napoleon; and Carnot, an eminent scientist, when minister of war, initiated the tactics with which Napoleon won his battles.

Even the profession of Kingcraft has examples of amateurs surpassing professionals. Cromwell, a yeoman farmer, and Napoleon, a doctor's son, will of course occur to every one, but a less frequently cited example is the "Grand Monarque." Louis XIV, as well as his brother, was brought up by their mother and Mazarin in pitiful ignorance, "their only books were women's looks." This form of education from the cradle upwards was certainly non-classical, and Louis did not even start to learn Latin until he had made himself supreme after Mazarin's death. Yet the life he led must have afforded the chances of unconsciously carrying out researches on human nature, as he found it at Court, which gave him the wonderful preponderance over other more classically trained kings of the day, and which won for him the name by which he is known in history. His case is the more wonderful because he was not gifted nor was he courageous. Frederick the Great, although generally well educated, was by his father prohibited from learning Latin.

Kings in general may be taken as examples that a non-classical education is a distinct advantage. Few kings

have been educated on the strictly classical lines to which the best known of their subjects have had to submit, and yet amongst kings relatively more great men are to be found than in any other profession, and such attributes as "the Great," "the Wise," are almost commonplace amongst them. In what respect does their education differ from that of students brought up on classical lines? A man who may have wished to be a clergyman or a lawyer, often enters a school and there teaches his scholars all that he was ever taught to value, *i.e.*, the classics, which helped him to gain prizes and scholarships. There never have been broken down kings available for the teaching of princes. Teachers of princes have by necessity to be mere subjects and must be but amateurs in the teaching of king-craft. In one of the most notable instances no pretence was even made to do this. Alexander the Great was educated not in diplomacy but in the truths of nature by the greatest scientist of the age, Aristotle. There can be little doubt that his youthful successes were due to a training which laid the greatest importance on the ascertaining of the real truth of any problem. No legal quibbles, no Greek sophistries and platonic speculations were likely to have been encouraged in Alexander's mind; the truth, the whole truth, and nothing but the truth was what he was taught to look for.

This extreme condition of a prince being taught by a scientist does not appear to have been repeated. The great discoverers of natural truths have been treated like human curiosities, and placed in museums, at least as keepers, while the education of rulers has been delegated to men who were assumed to be walking encyclopædias or polished gentlemen, to classics like Seneca, men who could discover nothing for themselves, nor teach how to search after truth. If their royal pupils' brains were not constituted on their own pigeon hole principle, they were declared to be dullards. Incapable of being crammed, and having no inducement to awaken their dormant

reasoning powers, such princes would almost naturally become failures.

Few other princes have had the same educational advantages as Alexander, at best they have been left to shift for themselves. The feudal kings, like Henry V, may have got an insight into the warrior caste with whom they drank and fought. Louis XIV, as already mentioned, grew up amongst a variegated set of women and courtiers. Pitt the younger studied nature as he found it in the sordid parliamentarian politicians of his day. The education of William the Silent was perhaps an ideal one for a diplomatist. Starting as a young page at the Imperial court he was, as it were, the shadow of Charles V, and as his private secretary he not only came into personal touch with all the celebrated men and women of his age, but was also forced to compare their personalities with their public and private actions.

Those princes who received and assimilated a purely classical education deserve almost to be pitied. Their polish may have been perfect, and those minds which were really small enough may have prided themselves, for instance, on such a trifling advantage as that of being considered the first gentlemen in Europe, and could express the weighty opinion that a leading statesman like Pitt the elder was not of that class, for did he not part his coat tails when he sat down. The mental abilities of men of this stamp would be limited to juggling with words and sentences, as was customary amongst the Greek philosophers, and instead of leaning on facts, and especially on modern facts, their actions at best would be guided by classical precedents.

The contrast presented by Alexander and Nero is typical of the two types of education. They were both highly gifted and ambitious princes. Philip was stabbed whilst walking beside his son Alexander, whose behaviour in murdering the assassin and allowing his own mother to glorify his father's murder, gave rise at the time to

serious suspicions of complicity. Nero killed his mother in order that he too might be supreme. Both princes were evidently determined characters, and both believed that they had special missions: the one to avenge the insults which the Persians had inflicted on the Greek gods and their temples, the other to civilise his glorious Roman Empire in accordance with the brilliant Greek pattern. Both princes succeeded in their objects, although they died young, aged 35 and 31 years respectively, but they differed in having teachers of diametrically opposed methods. Alexander was taught by Aristotle to reason, to contemplate, and to partly understand, the wonderful workings of nature. Nero was taught by the classical Seneca to remember what others had thought before him, and instead of grasping the essence of nature, he plunged into the filth of Greek mythology and history and got entangled amongst the weeds of their philosophy or sophistry. Unfortunately, too, his eyesight was hypermetropic, and to him the world must have been very blurred. No clearer proof of the banefulness of this classical education can be given than that after visiting Athens and making himself more Grecian than a Greek, he returned to Rome, bent on his civilising mission, and assisted in the arena at public exhibitions of sexual aberrations, which, though they have been praised by classical philosophers as virtues and believed to be such by Nero, are by the north European States treated as criminal abominations. Even Australian bushmen, unhampered as they are by a European sense of decency, would have blushed for mankind had they been present at these performances.

These civilising efforts of Nero, even more so than his personal crimes, including the murdering of his mother, wife, and teacher, must have severely shocked the, as yet, comparatively virtuous Roman population, and may have been accountable for his fall. But he left his mark, he had sown the seed, and the last of the true Cæsars was the

man who initiated the demoralisation of the Romans and the decay of their empire. Alexander's work has been of a totally different nature. His success was so immediate and complete, that when he had avenged the Greek gods on the Persians he gave way to the fascinating dream of World Empire. In his days it was a mere one man idea, and had not the vitality of its Roman revival. The Greeks, on whom he relied, were not in sympathy with it, because for generations their state idea was the very restricted one of wishing to live within walls of a townlet patronised by one or other of their gods. The World Empire idea disappeared with Alexander in his drunken revels at Persepolis, but he set an example which has had many imitators almost in all ages up to the present day.

The reticence of non-literary men and the persistence with which literary men extol the classics, is, by the latter, claimed as a proof that without Latin one would not be able to spell English words, nor know their meanings, one would find it difficult to learn foreign languages and would not be able to think correctly. About the first two claims it may be said that, like the word signs of the Chinese, our curious spellings of imported words have to be adhered to because their weird pronunciations do not convey correct meanings to the average man. No one can deny that Englishmen are gifted linguists, but the very years which should be used for learning living languages are devoted to one dead one for examination purposes. Do our literary men really believe that they could not think correctly except under the fossilising influence of dead languages? They do not surpass the ancient writers, who wasted no time on classics, nor the non-classical founders of our languages, like Dante, Luther, and Shakespeare. They cannot alter our thinking processes; a Frenchman still places his subject on a pedestal: "My son, he has worked diligently;" and a German still uses verb phrases: "He has diligently worked." Even a dog

may be trained to walk on two legs, but left to himself, he walks on four; and though we are trained to argue on ancient lines our method of reasoning is still Anglo-Saxon, Welsh, Scotch or Irish and betrays itself in our modes of expression.

These several remarks about classical teaching are not directed against the substance of Latin, Greek, and Hebrew thought, nor against the study of ancient and modern processes of reasoning, but against the tendency which is fostered by every form of competitive examination of intensifying the infantile gift of easily learning anything and everything by heart and thereby discouraging the development of reasoning powers. These remarks are also not directed against the study of Greek and Roman writings, on the contrary, those who take an interest in antiquity and who have the necessary gifts, could do better than stop short at comparatively modern classics, surely they might make themselves conversant with the classics of all nations, Chinese, Hindoos, Egyptians, and Babylonians. In fact, it is absurd that the people of Europe should, from their earliest childhood be trained to rely for information about everything on the few books which, one might say, were out on loan, both when Cæsar destroyed the first Alexandrian Library with its hundreds of thousands of books and when the Arabs destroyed the second one. The study of the few surviving books, often mere fragments, is not education. True education is research, and if the process which in individuals is called reasoning, is in communities represented by the process called education, then, just as individuals should improve true reasoning abilities, so nations should improve true educational systems. England encourages research into human nature amongst the young by means of sport, the Continent encourages research into natural subjects in its Universities, but in China the absolutely classical training of all, has the same effect on the nation which opium smoking has on the individual. The

Celestials and all classical scholars do not live in realities, but only in antiquated dreams and hoary ideas.

Although the chief educational process of a nation is the early education of the individual, and although some sub-states, especially religions, have recognised that it is during childhood that dogmas and certain reasoning processes, including obedience and faith, have to be instilled, yet the repeated attempts to educate nations by the state have not, as a rule, been successes. Probably, but this is merely a suggestion, because the state powers which decided on any particular line of education did not really wish the nation to reason, but only to accept beliefs, and possibly these powers did not represent a national tendency, but a class tendency. Had these efforts at state education been directed to improve the reasoning powers, then the natural tendencies of the people would soon have come to the front and the soul of the people would have manifested itself more clearly than is possible when every individual is taught from earliest childhood to look back for ideals of behaviour to the personages of Hebrew, Greek, and Roman legends.

Because of frequent failures in attempts at child education, constitutional states profess to have faith in the reasoning power of the adult multitude, and efforts are in such states constantly made either to educate the proletariat, or more generally the people are left to educate themselves. Now what is the nature of this education? The pulpit, the platform, and of late the newspapers and books. The idea is a beautiful one if only the listeners and readers had in their youth learnt to think, to reason from facts, to do research work. Unfortunately the conditions are all the other way. A child has been brought up in a particular faith and his religion is to him an accomplishment. His political views are also accomplishments. If he did not go to his Church, if he did not attend political meetings of his party, if he did not read one-sided political and other articles, his accom-

plishments, for such they are, would get rusty, he would no more be accomplished in these matters than he would be in fencing, or playing, if he did not practise every day. He attends divine service not to study religion and religious systems so as to reason which is the best, he listens to the divines of his own particular persuasion in order to maintain his accomplishments, his religion, at a high state of perfection. Were it otherwise, churchmen and nonconformists would listen to each other's preachers, and Christians and others would make a study of Buddhism, Mohammedanism, and other philosophic systems.

Similarly with regard to politics. These are not cloaks which can be put on and laid aside, they are of the nature of accomplishments. A rabid conservative or radical is an accomplished conservative or radical, and under the flimsy excuse of not wishing to swell an opponent's meeting, he avoids listening to the one but will cheer to the echo every word of his own leader who confirms him in the ideas in which he and the rest of his party have been brought up. Such men aim at improving their political bias their accomplishments, not at discovering the best political principles.

The views expressed in newspapers may be intended to be educational, but every editor knows that it does not pay to write in praise of views which are not held by his readers, and for this reason, the views expressed by newspapers are by outside politicians looked upon merely as editorial guesses as to the average tendency of the readers. The system of writing in order to please, is carried even so far that facts which do not harmonise with popular views, are either not published or are merely summarised. The whole of the modern news distribution system is arranged on these lines. The various agencies are not paid for the news which they send out, but for the news which their clients publish. If, for instance, during the Boer war, any international news-agency had sent long accounts of

some British advantage to Continental papers, this would have resulted in a serious financial loss, for such matters would not have been printed and would not have been paid for. On the other hand, every British reverse, as it was sure to be published abroad, was telegraphed there in full. Thus, although the great news-agencies may be thoroughly impartial, they have no choice in such matters, and it is perfectly true to say that the political bias of a newspaper can be discovered by reading the news which it publishes and without studying the leading articles. It may be remembered how grossly misinformed were the Germans during the Boer war, and that in the South and West of Ireland the French, in 1870—1871, were believed to have been uniformly victorious even after the declaration of peace and the surrender of Alsace and Lorraine. The German victories were distasteful to Irish readers, therefore the newspapers did not publish them.

English journalism occupies a deservedly high place in the estimation of the world. It is not controlled by the state, and except for a few men who make a business of blackmailing and touting, English editors cannot be bought and sold. But the newspapers themselves can be bought, and every now and then there is a report that a journal has changed hands. At first it protests that its tendency will not change, but very soon it may be writing against the party or the class which it once favoured. Then the conservative, radical, or unionist, who refuses to read a paper of the other side, finds himself in a position of great perplexity: either he must give up reading the paper which he has always read, or he must read news which disagrees with his views. If the change of editorial view is not too rapid and too drastic, the reader may continue to read on, and may perhaps, unconsciously acquire new political views, otherwise, he will leave his old love and subscribe to another paper which maintains his old political accomplishments at a high state of

perfection. It cannot exactly be said that newspaper articles are substitutes for a classical education, but they are certainly written with the object of relieving readers of the troublesome effort of thinking for themselves. Arguments are presented in a workable form, and the breakfast reader can use them without the trouble of inventing them himself.

Research work on the part of a nation is a different process. It attains results in spite of pulpit, platform, and editorial articles, but generally, only in cases of national catastrophes. The average common sense, which is nothing else than primitive research, arrives at conclusions which occasionally brush aside religious and political dogmas. The effect is not always a good one, and very naturally so, for the average individual has a classical training, he has lost the power to enquire and has not perfected the reasoning mechanism. Generally, too, the conclusions arrived at are lame and halting, for the larger a community the more numerous are the conflicting views and the less definite the general tendency. Many people believe in the political dogma which says "Vox populi vox Dei," as if the momentary tendency of a bare majority were always right. Generally that voice is quite wrong, and when it leads to action, disaster is averted, if at all, by some single master mind, which circumvents an expression of popular will. The French Revolution was the Nation's cry for liberty, and Napoleon administered the tonic. It was undoubtedly a popular decision which under Marius of Rome created the standing army, and it was also a popular decision which admitted non-Romans into their army, but this paved the way for the German hireling, who ultimately absorbed all real power but not the Roman spirit of Imperialism. It was also a popular tendency which led Venice to acquire a footing on the mainland and caused her fall. Many modern instances could be cited, but they have not yet produced their full effect. Even the popular reform

bills have been but barely grasped by the nation which asked for them, and it is only now, apparently too late, that the working classes realise that they can roll the taxation burden from their shoulders on to the comparatively smaller class of brain workers. Too late, because already the world is awakening to the fact that nations can stand a much heavier taxing burden for war purposes than they have done in the past, and as one nation spends money on this object so must others do the same, and therefore it is inevitable that the manual workers, as heretofore will have to bear a heavy burden of taxation either in order to defend their homes from invasion, or at a later time, because of outside domination.

These remarks suggest that it would be well for the state and probably well, too, for the individual if each child, instead of having its excellent memory not merely utilised but intensified, were also led to awaken the slumbering reasoning mechanisms; that it would be better if it availed itself of the wonderful memory arrangements of the brain, to store it with useful and living facts rather than with the fossilised records of intellectual gymnastics of the classics, and that it would be best, as soon as a child's brain has acquired the necessary solidity, to help it to build up and exercise the reasoning mechanisms in such a way that it will work rapidly, correctly, and with the least amount of friction.

To train a brain to think in accordance with classical patterns and on classical facts is like constructing an automatic machine tool. If a bar of some metal and of a definite diameter be fed into it, the various cutters come successively into play, hour after hour, day after day, year after year that automatic machine tool turns out one type of screw or stud or other object, each one like its predecessor, the same metal, the same diameter, the same length of head and shank, the same number, pitch, and size of threads. Such an automatic machine tool is a mechanical marvel, and so is a classically trained intellect

which excels in turning out uniform work. But for general usefulness neither device can compare with what might be likened unto an amateur's lathe, a tool which can do everything with every material, steel, brass, glass, wood, etc., turn, bore, thread, tap, mill, grind, and which can turn out round, square, oval, and multiformed objects. Such a machine tool is the representative of a common sense brain, whose mechanism has not been specialised in the direction of utilizing only classical precedents and arguing only on stereotyped lines, but has been trained to think quickly and correctly on all things and to deal with any modern event in a rational spirit. It is the amateur's brain and the amateur's lathe, as distinguished from the classical brain and the automatic tool, which does these things. Aristotle, a pupil of Plato the philosopher of ideals, was an amateur scientist, and the founder of ancient natural sciences. Galileo, Kepler, Newton, and Luther were indifferent classical scholars but enthusiastic amateur scientists and founders of new systems.

These edifying examples of straight thinking brains have already produced changes in educational systems of nations, and although competitive examinations must necessarily tend towards making a classic of each new subject as it is created, and classical bookworms of its victims, the research spirit, which burst into life with the Reformation, is far from being smothered and has even attacked classical literature. The classical method of accepting as proved a dogmatic pronouncement, and arguing from it, is largely giving way to the research method of enquiring into the truths of ancient assertions; and nowadays, to quote scripture and the ancients in proof of the earth being flat and standing still, and of the sun moving, appeals to only a handful of men who profess to reason, but who are perhaps not able to do so if they try. They merely remember those stories which they have heard in the nursery, and, like King James, they never forget, they never learn.

When dealing with such brains, which are either too small to think as well as remember, or too unyielding to be converted into thinking mechanisms, it is doubly important, while young, not to cram them with lies, and that is what all classical records are, until they are looked at in the light of their past surroundings; nor does it seem wise to teach the wordy or logical process of thinking which was elaborated by the ancients, who confounded logic, the play of words and their double and uncertain meanings with true reasoning processes. Men, like Newton, who could think about facts which had as yet even no names are the inventors of new sciences.

Greek education was at one time of the nature of research work, but gradually the results which were obtained by a reasoned process were adopted by states within states and then appeared as schools and dogmas. This petrifying process was very marked when Greek thought was transplanted to Alexandria. It was there joined by similar living Jewish researches into theological subjects, but the two healthy plants were soon subjected to pruning processes which hindered the branching out into new directions, and after a time any tendency towards research was treated as heretical and the invention of creeds and the battle of faiths as to the real meaning of such odd words as had been used by older generations and which perhaps had been wrongly reported or translated, is all that the succeeding generations up to the Reformation have gained by the unique experiment of giving that absolute liberty of thought in which the true Greek philosophers were able to indulge.

Up to the time of the Reformation, the anxiety of Church and State leaders to educate their people in the paths of what were then considered the only truths, had grown so strong, that men who dared to use their reason, who attempted research work, were actually burnt at the stake. The reaction which set in, marks a period of feverish and misdirected research and the results attained,

including the fearful Thirty Years war, seem to have been so discouraging that another period of classical education, that based on the few surviving writings of the Greeks and Romans supervened. However, some researches, notably such scientific ones as the discovery of the Jovian Satellites and the circumnavigation of the earth, which had first electrified Europe into using its reasoning power, could not be killed, and gradually a love of real scientific research arose which has led to the introduction of exact methods into domains which once rested exclusively on tradition and dogmas.

Measuring devices, especially the balance, were for the first time used as a help in research work. It is true, the balance must have been known in the earliest Egyptian dynasties, for the individual beads composing golden bracelets of those days are occasionally all of one weight, but it was not until six thousand years later that the balance was introduced into necromancy and alchemy, and it was not until then that physics and chemistry could rise to the level of sciences. Even mathematics laboured under the disadvantage of having no balance, for, Euclid, is merely a philosophical system or an exercise in logic, a string of geometrical puzzles carefully arranged in such a way that the solution of one depends on the solution of the preceding one. It was not until the Arabs introduced the mathematical balance, which is represented by the equation sign (=) and thus invented Algebra, that mathematics became a real science. Book-keeping, also, avails itself of the same balancing system, debit and credit sides having to be equal. Having introduced one balance and found how useful it could be made, research workers have invented numerous others. It was Newton who first pointed out, what sounds like a truism, that action and reaction are always equal and opposed to each other. This is perhaps part of the great balancing principle called conservation of energy, which was discovered later. The loss of energy from one of a pair of colliding billiard

balls is equal—this is the balance—to the gain of energy in the other. Similar balances have been discovered or arranged with regard to heat, chemistry, and electricity, and have raised their studies to the level of sciences. Even natural history subjects have their special balances, such as "the survival of the fittest," the law of averages, Mendel's theories, etc. There are other subjects for which their votaries claim that they are sciences, but as they have not yet devised suitable balances, that claim must be dismissed. Historical research, the balancing of information and evidences is perhaps a science, but chronology is not a science. Religious criticism but not religion, is a science. Classically minded scientists, who naturally attach prime importance to words, will say that science is the art of defining; they cannot however manipulate ideas which have as yet no words attached to them. To them the naming of 200,000 insects is a science, the study of the objects troubles them less.

The foregoing remarks, based on the idea that education is the thinking process of a nation, has, one might say, developed into a condemnation of classical training, but that seems so only when this training is, as now in China and at one time in Europe, the only one indulged in, and when the national advantage of research education is not understood. There is, however, another point from which to look at national thought as exemplified by education. Its civilising and polishing effect might be likened unto a lubricant which facilitates the workings of States and, if unity and harmony imply perfection, then this form of education, the learning of conventions, may help to make a state more perfect. If that is to be the aim of education, then those members of a state who have attained more perfection than others should be the teachers of the rest. This is not only most natural, but is also the expressed feeling of the masses, for, whenever they wish to find fault with their superiors, they assert that it is the duty of the sovereign, the nobility and gentry, the clergy,

the employer, the official, etc., to set good examples to those below them: the idea being that those who claim to be more perfect, more enlightened, more civilised, more conventional than others should improve their inferiors. Occasionally this has been done, or at least attempted. Charlemagne considered that the education of the people was one of his royal privileges and duties; he founded schools for his own ignorant subjects, and being himself incapable of reading or writing, he forced education, in the guise of Christianity on the surrounding tribes. Many other kings have been actuated by the same wish to raise their inferiors to their own level. The "Grand Monarque" even danced in public in order to infuse grace and civility into his own boorish nobility. The Catholic Church, convinced of its own superiority, has been practically the only educating factor in Europe for several centuries, for, after the fall of Rome, education had also gone by the board. The members of the Society of Jesus were the greatest educationalists of their time. The Church of England has, even up to the present day, been a great educational factor, and though her methods seem now to have been condemned by the nation, a day will no doubt come, and has perhaps come, when the disappearance of her influence will be deplored.

The nature of the work of the Church can be best understood by comparing Church of England schools of forty years ago with present day Board schools. Education in those days was voluntary, now it is compulsory, the means in those days were limited, now they might be unlimited. The ideal of the Church was the making of good citizens and good Christians, the ideal of the Board schools is the making of independent and therefore selfish individuals. But the greatest distinction between the two educations is the elevating influence of the old one and the levelling down influence of the new one. Forty years ago, practically all village schoolmasters had been trained for service in the Church, but failing to obtain

livings, had to seek other employment. Their training was certainly classical and unpractical, but being drawn from the upper classes they elevated their pupils, and quite a host of celebrities emerged from out of the labouring population. How is it that to-day when education is free, and when libraries exist in every village, that the labouring classes produce no great men? The answer seems simple enough: modern Board school teachers are drawn from the lowest class, whereas formerly the mere presence in a village of a teacher who was of a higher class, who was more refined than his surroundings, who might be related, however remotely, to some celebrity, would have an inspiring influence on the villagers, and their children. Then, also, if as some kindly teachers would do, they actually encouraged their scholars, there would be every prospect that one or more of them would wish to improve themselves. The Educational Administrations of to-day discourage the upper classes from teaching, and by all means possible encourage the lower classes. One reason is an economic one. Boys and girls whose fathers may have been labourers earning perhaps 15s. a week, are encouraged to qualify for teacher scholarships of 20s. a week, because when matured they can be had for smaller wages than teachers from the better classes. Another very powerful influence is the political training to which the masses have been subjected, who do not look on education as being a duty which the state owes them, who do not ask for the best that can be got, but who claim to be allowed to have a share in the state plunder. They claim that schoolmasters' berths should be open to the low as well as to the high. The result is that the teaching staff of Board schools consists almost exclusively of the lowest class of citizen. Not low as regards immorality and crime, but low as regards civilisation and aspirations. They suffer from want of manners, conventions, polish. In place of aspirations they are full of grumblings and complaints. Very few, if any, have

any family pride. A large majority do not know who were their grandparents. Home comforts, even when a teacher's berth has been reached, are not known to them. Whether they hail from villages or towns, the surroundings of their childhood are probably large families huddled together in one or two rooms, improvident parents, and perpetual mutterings against the rich and the refined and against the restrictions of authority and conventions. It is truly surprising that the sturdy British artisans, whose unions exclude labourers from their trades, should allow the labourers' children to become their children's teachers.

There is no harm in being well behaved, yet manners are fast disappearing, and refined men and women would rather have associated with the illiterates of forty years ago, than mix with a crowd of factory lads and lasses who have been educated by our Board schools. Nowadays, each workman has the chance of rising ever higher, but the longing to do so has been smothered at his Board school, and the laws of his union forbid him to work more than the laziest of his lot. He must not welcome labour saving machinery, but fight against it, nor may he invent means for improving his work and himself. These remarks could any day be confirmed by men like industrial insurance agents who mix with, or rather haunt the resorts of the working classes, and who, unless they find their members with their wages in their pockets, are likely to lose the weekly premiums.

Let it be supposed that the above views are wrong, that the teachers are drafted not from amongst labourers' children but from the artisan class, even with them civilisation and early surroundings will still have been low, nor is their love of labour as great as hard working literary men, who write about them, fondly imagine. Men who engage in brain work, who have ambitious schemes, work all day long and often either dream of their doings or cannot sleep on account of them.

That is real hard labour and pulls down individuals with far greater force than any bodily overstrain. But what workman will overstrain himself? The public are asked to pity the overworked sailor who is said to labour night and day, but who however does nothing of the kind. Of course a certain number of hands have always to be available on deck for emergencies, but even at night, half, and sometimes two-thirds of a ship's watch on deck are asleep in odd corners waiting to take their turn at the wheel or look-out. The sailor leads, in fact, such a lazy life that work has to be made for him. The idea is a laughable one of washing decks in a rain or during a heavy sea, of polishing brass which is being besprayed by brine, but these occupations are absolute necessities on ships where men would die of weariness or would mutiny if they had no more to do than what is absolutely essential for safety and proper navigation. Then there is the industrious mechanic who is believed to work with untiring energy and absolute precision. That is the popular notion. The facts are that he freely leaves his work at night, generally he runs from it; after fifteen hours rest and amusement he returns to the shop, turns a handle and then his lathe, slotter, planer, miller, automatic machine, or other tool moves, and he stands quietly by doing nothing. After a time the particular process is ended, a labourer is called in to lift out the finished article and to introduce a rough piece. Again the tool moves and for hours the skilled workman watches the shavings being cut off, and when the clock strikes the hour he rushes away home. If difficulties arise he calls the foreman. It might be possible for such a man to watch several machines, but, even if he wished to do so, he dare not. Does the master fear that divided attention would interfere with the accuracy of the work? Not a bit. It is the union, the workman's creation, the quintessence of the average working man's reason, which forbids him to do as much as he can, to use the inventions of man for man's advantage.

The mechanic wishes to lead an idle life and therefore he votes in his union that he shall be compelled to lead an idle life. That at best is the class from which the Board school teachers would be drawn. And as for the Science and Art teachers! No words can be strong enough to condemn a system which tears away from home children who have had the misfortune, one might say, to obtain scholarships, and which sends them to London where nearly the whole of the miserable £50 is swallowed up in fees, and where such students have to live in wretched holes and beg and starve in the hope of one day getting their share of the state plunder, a teacher's berth. The training which they receive may be excellent, but the effect which they produce can only be of the levelling down nature. It is sinful that such small scholarships are allowed to go to lads who have no other resources.

If every member of the state has a right to plunder the state, that plunder should be education, which should be of the best and free to all, but surely the state should not degrade its sacred offices of teachers by letting the berths be treated as plunder for the multitude. Education would be dearer than now, but what of that, the state should remember how much it has saved in the past by not educating and by letting the Church of England do this work without payment.

Before concluding, it is desirable to glance briefly at that broad education of nations which, like the practical education of adults after they leave school, is a matter of experience and often very one-sided if the individual of the state is incapable of reasoning.

After the discovery of the East and West Indies, Spain, Holland and Portugal aimed successively at exploiting distant people for their special advantage, until they successively gave way before a similar desire on the part of England. Apparently the English tendency has never been strongly imperialistic, and the ideal of her traders was trade rather than the Roman belief in the right to

dominate others. During the last two hundred or three hundred years the English tendency has been directed towards pacifying the world, in order that industries might spring up, even amongst savages, and that trade might flourish. Force alone could have produced no effect, and almost instinctively English traders and English statesmen adopted a system of educating the inhabitants of coasts which was nothing else than a slow but sustained process of imparting to them thinking powers by which they gradually reasoned themselves into the knowledge that it was to their advantage to behave peacefully, not only towards white men, but also towards their neighbours. This tendency is diametrically opposed to that of the Mohammedans, who, even when too weak to attack, foster strife amongst their surroundings.

It was England, and one may say only England, which cleared the coasts of pirates and converted the oceans into true international highways, making them safer even than the roads in Continental European states of a hundred years ago. A similar work had once been carried out by Rome in the Mediterranean. England established trading centres in various parts of the world without the desire to appropriate the land and its people, but she was forced into taking possession by European rivals who were swayed, not by commercial, but by imperialistic ideals. India fell into the hands of England while warding off the French attack which aimed at driving Englishmen away. Similarly North America, including Canada, became English while Virginia and a few other small colonies were being defended against the French efforts from the Mississippi and the St. Lawrence to drive the English settlers into the sea. Had the English tendency been subjected to no fluctuations, the United States would have remained an integral part of the British Empire, and would now undoubtedly have grown to be the predominating partner of the Anglo-Saxon Confederation, in the same way that Constantinople once eclipsed and

survived its parent, Rome. Unfortunately, under the Georges, the English trading ideal had for a time been eclipsed, and America having by England been liberated from the Bourbon Empire ideal, liberated itself from the similar Empire ideal of her Guelph rulers. Had Pitt's advice prevailed the Anglo-Saxon community might by now have been a united whole under a single Lord Protector and could have dictated peace and prosperity to the world.

From that date, however, and notably in contrast to the French Imperialism of Napoleon and Russia, England has accentuated her trading ideal. Free trade, or rather desire to trade without molestation, was the English motto long before Cobden exploited it for the benefit of his class. England had protected and encouraged trade in every corner of the world, and generally things went well. Naturally savage tribes had occasionally to be punished and forced to promise friendly relations, but, for about 60 years after Waterloo, England showed no desire to absorb them. France established herself in Algeria, but otherwise did not meddle with unappropriated coast strips. Suddenly Bismarck resuscitated the Roman World Empire idea, and almost naturally attacked the English method of educating savage tribes and nations.

Due, no doubt, to mental laziness on the part of British statesmen, they believed that the trading peace of the world, England's most meritorious work, was a natural condition, and oblivious of the fact that this condition was barely a generation old, Bismarck was allowed to find pretexts for seizing strips of African coast. Up to that date Germans had the same right as Englishmen to trade, and Germans are still as numerous in Calcutta as in Manchester and flourish in all British colonies, but Bismarck seems to have wished to teach his people that it would be even more beneficial to possess distant lands than to be allowed to trade.

His view may have been correct; German colonies may

become profitable to the Fatherland, they may become a source of strength in case of a future war, but these considerations do not affect the educational question. The important change which he initiated was that England, out of fear of being excluded from trading everywhere as in the past, suddenly had to replace trading conventions with African coast inhabitants by Union Jacks planted in the soil as tokens of actual possessions. Germany grabbed one strip of land, England had to seize an adjoining island, France took Madagascar, and drove out the English and Germans, Germany took another strip and drove out English and French, Tonkin, Tunis and Abyssinia were appropriated or attacked one after another and the expansive formula about the "Hinterland" not only robbed England of the chance of developing her trade on the upper reaches of the Niger but forced her to penetrate into the vast interiors and, as it were, to foreclose and to add half Africa to her Empire. This was merely a nominal change, for others have still the same rights as Englishmen to trade in English Colonies as they had before Bismarck's days, but this change of policy constituted a backsliding in the English educational process of the world which is one of the worst results of the German imperial idea.

Napoleon I. had sailed to Egypt and had poured out French and Egyptian blood like water, but achieved nothing, yet because of his exploit France for a long time claimed to have a special interest in that land. Years ago some missionaries came to grief in Abyssinia, and England at much expense and trouble exacted reparation, and then left the country and never even objected when Italy attempted conquest. The Emperor, his people, and the people of the whole world had then, as on many previous and subsequent occasions, been taught the lesson, that wrong-doers against England would certainly be punished, but that neither accidentally nor intentionally inflicted injury would be used as an excuse for acquiring

their territory. Tribes and their chiefs might tremble, as a culprit trembles in a criminal court, but they were learning that they need not feel, as litigants feel in Chancery Courts, that they may lose all.

Years rolled on, the World Empire idea was now abroad, and when in 1897 two missionaries were killed in China, Germany appropriated a whole province, and Russia following suit with Port Arthur, England did the same. Yet by not fortifying what is really one of the most inviting harbours, she seems to have been saying to the world "We must do as the others do though we would rather not." The great harm which is being done by the Bismarckian revival of making misdeeds serve as excuses for grasping foreign lands, is acutely felt by many statesmen of the present day to be a serious disadvantage, and they try to counteract it by agreements not to partition certain parts of the world. But paper treaties are rarely worth the ink with which they are written, and when the time comes, the would-be World rulers will seize what they can in spite of treaties, as for instance Russia having signed the Boxer convention, promptly ignored it by annexing Manchuria, Austria broke her promise in order to seize Bosnia and Herzegovina, and Japan has done the same with regard to Corea. There can also be no doubt but that Germany would seize South American states were it not for the Monroe doctrine, which, having been suggested by England, has a double backing of the most formidable character.

It will thus be seen that even in the slow process of educating the world with regard to trading with Europe, there are two systems; the one has been slowly evolved by England, who made savages understand that Europeans desire fair trading facilities and have no wish to rob; the other system which is as old as history and therefore unfortunately the more likely to survive, gives to the strong a right to what he can take, and any incident may be used as a suitable excuse for an attack on the property of a

weak neighbour. Had this ancient ideal been resuscitated by a savage horde, it might be expected to die out again, but being fathered by a nation which claims to be the best educated in the world, it has every prospect of success, and then the safety of the ocean routes, the liberty to trade anywhere, which was established by England may, at no distant date, give way to the more primitive conditions when each seafaring nation discouraged all trade but its own, even to the extent of attacking or encouraging attacks on the trade and property of others with whom it might be nominally at peace.

This possibility is foreshadowed by the vigorous efforts which Germany is making to create a battle fleet which is utterly unfit for police duty, but heavy enough to smash up in detail all small warships which in all parts of the world are carrying out the onerous duty of policing the seas. From the day that English warships may feel prevented from going where they think fit, piracy, in which possibly states may join, will be the order of the day, and the disorganising effect which this would have on many semi-civilised states will take years of subsequent peaceful education to remove. The world educational effort of England will have been wasted.

It is to be hoped that these dark days are still in the distant future, for England has been a world power for only a hundred years, whereas Rome, with far more primitive ideas about civilisation, lasted four hundred years. In the meantime, education, the thinking process of nations, may have been so far perfected that whatever dangers there may be ahead will have been felt and provided against. Unfortunately educational improvement is necessarily a slow process, and has always been hampered by false sciences; it is therefore desirable to place these on a better basis, and to provide scientific balances where they are wanting. This is particularly desirable with what should be the public thought of national events, the so-called science of political economy, which is sadly in want of a balance and a measuring tape.

POLITICAL ECONOMY.

MANY men who have written on political economy subjects have done so with the best of intentions, but their efforts must always have been of the nature of the speculations of the Greek philosophers, who, for instance, taught that the world consisted of atoms, but left alchemy where it was, because the chemical balance had not yet been introduced, who taught that the planets moved round the sun, but befogged subsequent astronomers, because the balancing power of attraction and centrifugal force had not yet been discovered. No improvement can be hoped for as regards political economy until it too is raised from mere dogmatism to the level of a science by the establishment of balances, at first perhaps arbitrary ones, like the arbitrary botanical classifications of Linnæus, but later on by natural ones.

How can a method be called scientific which starts off, perhaps, with the dogma that the wealth of nations consists in the sub-division of labour, which takes Machiavelli's "Prince" as its confession of faith, or which, like the Ephesians, cries itself hoarse on the subjects "Great is the power of Protection," "Great is the principle of Free Trade"?

Such dogmas are invented by sub-states, and are preached to the rest of the world for the benefit of special classes. Years ago Russian statesmen must have spent no end of money and influence in persuading, as they did, Englishmen of the past two generations that there was a divine power in Peter the Great's mythical testament, and that the expansion of Russia was inevitable, and also that Russia must have an outlet to the sea. To Englishmen, who all live within 100 miles of the coast line, this

dogma seems natural, but it certainly did not apply to Russia. Moscow is 400 miles distant from the nearest shore, and is naturally an inland state. The Baltic provinces were wrested from Sweden, the Black Sea provinces from Turkey and Manchuria from China, not because they gave sea outlets to Moscow, but because they were fertile districts, nevertheless the dogma preached to gull Englishmen has always been that Moscow must have an outlet to the sea. More recently the sermon is being assiduously preached that Germany is to exercise a world policy, and for a time this may now form the basis of a new science of political economy, according to which, perhaps, England will be expected to give up her coaling stations. Busche's revelations about Bismarck and the so-called reptile press are known to all, but additional light is thrown upon the subject by a few remarks in the *Morning Post*, 2.11.1908, according to which the German Foreign Office makes attempts to use English newspapers for propagating, in an English dress, views and statements to which it wishes to give currency in this country.

What was at the back of Cobden's Free Trade dogma? Not the interests of the nation, which then consisted of farmers, but of the manufacturers, a small but rising class. Not content with the glorious advantages which they were reaping from the power stored in coal, which, combined with labour saving machinery, places about two horse-power at the disposal of every factory workman and makes him capable of turning out about as much as 20 skilled spinners, weavers, etc., of old; but the mill owners must needs pour out money like water in order to saturate the people and legislature with a dogma that food should be free, in order that the expenses for a factory hand, who does twenty men's work, shall be relatively less than half a farm labourer's cost used to be. England has swallowed this dogma, hook and all, and if the farmer whose lucrative business has gone, raises objections he is

threatened with fixed rent conditions. It may be right that Moscow must have an outlet to the sea, that Germany is destined to have a world policy, that neither food nor drink should be taxed, nor manufacturers but only land, but appearing in this dictatorial garb, political economy is a religion, a bundle of dogmas which must not be questioned, which have to be accepted as the inspired words of individual prophets. So far political economy is certainly not a science.

Somewhat similar remarks apply to Adam Smith's dogma about the sub-division of labour being the wealth of nations. Of course, this may be true, as it may be true that either protection or free importation is the best of all possible things, but the enunciation of dogmas is not science. Adam Smith's is a very ancient dogma and has in the past worked untold harm in stunting the growths of nations, for it is the foundation stone of all caste systems. Rome, and subsequently the European aristocracy, sub-divided the labouring classes, the bondsmen and slaves from the freemen, who alone could bear arms. In India there is a multitude of castes, the priests, the soldiers, and the sub-divisions of labourers. Europeans have to have innumerable servants because the labour of attendance is thoroughly sub-divided. One man cooks but does nothing else, one man waits at table and does nothing else, and so on through a list of about two dozen offices. That system is perhaps 4,000 years old and has probably become part of the soul of the people of India. Adam Smith has tried, and successfully tried, to graft this tendency, which is quite Scottish, on to the English plant. Sub-division of labour was not invented by Adam Smith, but he made it the corner stone of his great work; he explained it and did this well. The dogma suited Scotchmen, for they are single purposed, a quality of which they are extremely proud, as it helps them on. Scotland's greatest king was a warrior, nothing else, for his single victory over a conceited boy king merely helped

to throw Scotland back into barbarism. Even in his days Scotchmen rapidly reverted into a horde of cattle lifters. How different is the case of Frederick the Great! Versed in almost every art and science, he showed himself to be not only a great general, fighting victoriously against Austria, Russia and France combined, but after his successes he may be said to have fed his country by encouraging the cultivation of potatoes, and he elevated his people in every respect. He was a law giver, art patron, an encourager of trade and industries and a coloniser. In Napier, Scotland had a great mathematician, who, if he had been able to grasp two ideas, like Leonardo da Vinci, could have been the inventor of Newton's fluxions and the discoverer of the law of attraction. Scotland boasts of one poet, but he was a poet only, and though there is charm in the powerful effects which he has produced with his rustic English, the liking for even the best of his songs departs when his numerous unpublished verses have once been read. How different was he from Goethe, second only to Shakespeare in dramatic powers and superior to him in philosophical summaries. Goethe was not only a poet but a politician, artist, scientist and philosopher. Such all round geniuses are numerous in England, France and Germany, but conspicuous by their absence in Scotland. James Watt, the inventor of the steam engine, is another conspicuous example of singleness of objective in a Scotchman. He lived as many years as other men, but during all that time his mind seems to have been concentrated on the steam engine, and even its application hardly entered his head. No wonder that he sent his son to be a clerk in Manchester. Had he but had the breadth of view which not only Roberts, but several mechanical inventors of Lancashire, revealed, he might have been the father both of the steam engine and also of the spinning jenny, the power loom, the turning lathe, the planing machine, the steam hammer, etc.

Kant, the greatest of modern philosophers, was the

grandson of a Scotch emigrant in Prussia. He never moved out of his native district of Koenigsberg, and steadily followed one definite line of thought, with which he earned his reputation.

The view here expressed that Scotch people are inclined to do only one thing, a tendency which leads to sub-division of labour, has not grown out of the above examples, they glory in their singleness of objective and steadfastness of purpose throughout life, these are traits which help them on. But why should Englishmen whose successes are due to a more versatile nature, cripple themselves by becoming one-sided? Is not the life of the butterfly a gayer one than that of the worm which slowly but incessantly bores a long winding tunnel into a piece of dry wood? Should the butterfly be forced to crawl when it can fly? Does not every occupation become monotonous if persisted in, and are not those the best artists who have many accomplishments, and should not artisans be artists? Michael Angelo and Leonardo da Vinci were not only sculptors, but architects, and engineers.

The position to which English workmen have gradually attained by adopting the Scottish principle of sub-divisions of labour is that formerly youths who wished to become engineers, learned the entire trade: pattern making, moulding, founding, forging, turning, planing, and fitting; now they are allowed to learn only one of these, and the workmen's unions, playing into the hands of the masters, insist that no change shall be made in after life; once a fitter always a fitter, once a planer always a planer, etc. The result is that if an engineer be dismissed, his chance of re-employment is so limited that it is only with the help of the powerful trades union organisations that he becomes re-engaged, and that is why he must join them. He has been crippled by a blow of the crutch on which he has to lean for life.

Is this an ideal condition? Is not sub-division of labour the dogma which is responsible for the grinding

down of intelligent and skilled labourer to the level of the ancient slave? His wages just help him and his family to live, and if that be large, he is impoverished. The ancients fed and housed their slaves and their children quite as well as any British workman is housed and fed, allowance being of course made for the absence of soap, strong drinks, tobacco, tea, coffee, potatoes, glass windows, and other modern additions of civilisation. A nobleman of old would not dream of sending away an old slave. A British manufacturer, especially since the law has made him responsible for any negligence of an old servant, will not dream of keeping him. Ancient slaves and modern workmen are kept alive by their labour. The ancient slave could die in peace, but the modern workman has to beg bread and a bed from the union. This is one of the effects of Adam Smith's dogma of sub-division of labour, and another effect of the same dogma may be seen in India and China, whose people are practically fossilised.

It is all very well to taunt political economy with not being a science because it consists of a bundle of dogmas and has no balances with which to analyse subjects, but that does not lead onwards. If balances be required let them be produced, or in other words, if political economy be no science how can it be made into one? That can hardly be done in these pages; it should be the business of political economists to construct more or less reliable balances and to test them. However, in order to give an indication of what might be done, three analogies will be drawn, taking as examples, firstly, the beam balance which is the basis of all practical and theoretical balances in the science of chemistry and physics. Secondly, an example will be taken from dynamics, as for instance, the balancing action of an engine fly wheel, and lastly nature will be appealed to by drawing into discussion the balance which exists between evaporation and rainfall, and river discharges.

The ordinary beam balance can now be constructed

with such wonderful accuracy that it will turn with the fifty millionth part of its maximum load, or in other words, if made on a large scale a good balance would detect whether or not one grain of wheat is missing out of ten full sacks of wheat. Such accuracy cannot be expected in any balance to be employed in a subject like political economy, a subject which deals not with gravity, one of the simplest manifestations of energy, but with the very highest, viz., state problems; but even the beam balance was not perfected all at once, and there is hope that any crude device which may one day be suggested, could be improved, just as the beam balance has been improved by a careful study of all disturbing influences and conditions which in themselves have often revealed new balances. It must also not be forgotten that as yet, with so many dogmas holding the field, it is difficult to say what it is that should be balanced in political economy. Thus, when the thermometer was invented nobody knew that relations existed between boiling points and pressures, between temperatures and volumes, nor that there were such phenomena as fixed freezing points, dissolving points, absolute zero, specific heat, latent heat, etc. No one cared, but many people were curious to know something about the temperature of the human body, and seeing that what looked like an absolute zero had been discovered, and seeing that the range from this point to the human blood temperature corresponded very nearly to an expansion of alcohol by one thousandth of its volume, a zero was chosen by Fahrenheit, who constructed thermometers, as suggested by old Roemer, in which this range was divided into twenty-four parts. Subsequently these divisions were quartered, and blood heat measured 96 degrees above zero. The division from freezing point to boiling point into 100 degrees was carried out by Celsius, when much was already known about heat, and now that the absolute zero has been discovered to be 273° or 492° F. below freezing point, some scientists would like to adopt

a new scale, possibly 1,000 divisions up to freezing point, each being equal to about half a Fahrenheit degree. Thus, even without this change, the absolute Fahrenheit scale is, as these figures show, a very convenient one.

The invention of the clock proceeded on very similar lines. Galileo compared the periods of swinging of different pendulums by counting the beats of his pulse. He may have wished to compare pulsations in different people and at different times, but finally pendulums were found to be sufficiently reliable, even for astronomy. They practically constitute the first balance in that science.

A plank laid across a tree trunk may at one time have been considered a fairly good weighing balance. Then on account of keeping the plank centrally over the log, an ingenious workman may have introduced pivots. On account of the errors inseparable from friction, the pivots were replaced by knife edges; doubtless these changes were slow ones, for artisans are very conservative. Gradually the modern balance was evolved but it is not perfect. The knife edges, even if quite sharp, may be wavy and are then more sensitive in one position than in another. The two arms may not be equally long and the knife edges not parallel, so that objects would weigh more in one pan than in the other, and more on one side of one pan than the other. These possibilities are always allowed for in accurate weighings. The beam of the balance has to be absolutely symmetrical, for even if there is a general balance, the top limb being thicker than the lower one on one side, and thinner on the other side would tend to alter the two lengths unequally for different loads. It goes without saying that the metal of the beam has to be quite uniform as regards quality. Yet when all these conditions are fulfilled it will be found that the zero position of the balance changes with time and has to be re-determined every now and then. A further complication is introduced by the very objects

to be weighed and considerable allowances have to be made for their bulk because of the buoyant effect of the atmosphere. Very accurate weighings are therefore reduced by calculation as if they had been made in a vacuum. The surfaces of the objects, by condensing both moisture and air, introduce new errors which can be allowed for only partially by weighing both small and large quantities. Even the heights of the objects to be weighed affect the result. Thus a slight difference can be detected if a rod 4 inches or 10 cm. long be weighed vertically and again when lying flat. In fact, by attaching long wires to a sensitive balance and hanging the weights high on one side and low on the other and then reversing, the diameter of the earth can be determined with a fair amount of accuracy, say to within one per cent. Although therefore one looks on the beam balance as being almost as simple and as absolutely correct as the equation sign = of algebra, it is evident that allowances have to be made for various influences which are all the more important the smaller the differences to be determined. Even the equation sign is not infallible, and every schoolboy knows that unless he is careful with regard to the + and − signs of square roots and with regard to expressions of the form % he may arrive at perfectly erroneous deductions.

These few remarks on the beam and mathematical balance will assist in explaining that all other balances which are, of course, of a more complicated nature, are subject to errors which have to be guarded against or allowed for, and physicists are constantly on the look out for disturbing influences and necessary corrections. Thus with regard to the equivalency of the chemical elements, corrections are being annually made by an international committee. Even they state every year the possible errors attaching to the various atomic weights. Then too astronomers are constantly inquiring into what laymen look upon as established facts. Every now and then observations are marshalled to show that the laws of

gravity which rule the solar system also rule amongst the most distant stars. Even the nightly observations of astronomers are merely material for confirming Newton's law of gravity and increasing the accuracy of the constants employed in calculations. The toil of hundreds of astronomers using the most perfect telescopes and clocks has not yet settled either the amount, a very small one, or the cause of the lunar accelerations, nor is the inclination of the ecliptic known absolutely. All these things are scientific balances or scales of comparison.

Now a convenient balance with which a start might be made in political economy would be to lay down, as is done in accountants' books, that income and expenditure are equal, that they balance each other, and subsequently to discover discrepancies and study these; they constitute the friction and other disturbing influences for which allowances have to be made.

At first sight this balance seems not only primitive but incorrect. Nevertheless, if every reader, rich or poor, will put his hands into his pockets and count his cash, he will find that it amounts to only a very small fraction of his annual income. If the annual banking transactions, as recorded in clearing houses, be compared with the bank reserves, these latter also sink into insignificance, and if a country's trade be compared with its available cash, a similar discrepancy is discovered. This latter comparison is difficult to make because, with free inter-communication, it is absolutely impossible to fix the amount of coin in a country, but Turkey, from the Crimean War to 1874, when the State went bankrupt, offers a convenient test. In 1855 the annual surplus of recorded exports over imports amounted to £300,000. This must have been balanced by a leakage of an equal amount of cash which doubtless continued, if it did not increase as time went on. A loan of five millions at 4 per cent. was obtained in 1855, of which about four millions were spent in making good the war damages, and in 1858 a new loan of five millions

at six per cent. was raised, of which only four millions reached Turkey, and a large portion went in war material and ships, so that in 1860 another loan was raised of 20 millions. Of this only 15·7 millions was handed to Turkey. Loans now followed each other in rapid succession until in 1873 the total received amounted to £67,279,000, for which a yearly interest of £7,329,000 was being paid. In the meantime about £6,000,000 had been spent on men of war, and probably £12,000,000 went in war material and small wars expenditure. The cash leakage in these years summed up to more than £6,000,000, while the total paid in interest amounted to £72,000,000. In the meantime the recorded excess of exports over expenditure had totalled to £29,400,000, and that amount of cash must have flown into the country.

In 1876 the position was this:—	
Receipts from loans	£67,279,000
Receipts from excess exports	£29,400,000
Total ...	£96,679,000
Expenditure. Cash leakage	£ 6,000,000
War ships	£ 6,000,000
War material and small wars	£12,000,000
Interests on loans	£72,000,000
Total ...	£96,000,000

Therefore only about £679,000 of the money received remained in Turkey, and £7,329,000 was in 1876 due to be paid for interest. No further loans could be raised and the State went bankrupt. If other countries were as thoroughly cut off from the world as Turkey was in those days, or if by any other means the amounts of money they receive and spend could be estimated, the public could

easily calculate the dates when they would have to refuse to meet their obligations or when new loans would be required. At any rate these examples show that the balance: that income and expenditure are equal, holds good to a certain extent, not only with private individuals but also with the banking world and states.

It is perhaps advisable to examine a few cases in detail. Every Saturday, or every other Saturday, heavy bags of gold and silver are taken to the factories to pay the wages; by Monday all this money is in the tills of the shopkeepers, and by Tuesday it has found its way back to the banks.

Incomes for the average individual are about the same all over England, and if a man spends all he earns it ought to follow that, where rents are high, food will be cheap, and *vice versa*. This is exactly what happens. In Glasgow rents are high, food is cheap, and also good. In Manchester rents are low and food is dear. In London rents are high and the cost of moving about considerable, so that almost naturally food is cheap and as a rule wages are high.

The cause of this balance may be due to the nature of human beings. Englishmen are not possessed of that manifestation of energy which figures largely in Evolution and is called economy, for they cannot, or will not, save. Raise their pay and they work one day less in the week than they used to do. This is often the main reason, and not the increased expenditure, which makes factory owners fight so hard against demands for increased pay.

Then there is the case of the public benefactor who spends perhaps £100,000 on model lodging houses in which workmen can live at a low rent. He finds, not that virtue is its own reward, but that it brings pecuniary reward, for his workmen paying little for rent, can afford to receive less pay, or at any rate do not demand increases when other factory owners have to concede them.

Another case of income and expenditure balancing each other made itself seriously felt when the Salvation Army

captured a large share of the benevolent subscriptions. At once the hospitals felt the pinch, and to make their case worse, the heavy income tax of the Boer War still further crippled the would-be benefactors.

It is of course evident that the suggested balance is not a perfect one, that some money is to be found in people's pockets, in shop tills, and bank safes. These differences between income and expenditure are of the nature of friction and have to be allowed for, just as friction is allowed for in mechanical devices. One community or state works with more friction than another. Thus on the London Stock Exchange fabulous amounts change hands without gold being called into play, whereas in India every truck load of wheat has to be paid for in solid silver. The knife edges of the financial balance in India are, as it were, not as sharp as those of the London Stock Exchange and a very large amount of cash, acting as a lubricant, is essential for its working. A few years ago there was a scarcity of silver and copper change in France, the deficiency may have been only a slight one, but everybody seized on small coins, and until the Mint had produced a surplusage the retail buying and selling all over France was seriously disorganised. There was a temporary deficiency of lubricant.

Cases in which the balance of income and expenditure works practically without friction, where not a farthing of cash disturbs the equilibrium, are bills of accommodation between bankers. A draws bills on B for a hundred thousand pounds, and B draws bills on A for the same amount. These bills are sold and circulate, and finally return and are cancelled. In the meantime both A and B have had the use of one hundred thousand pounds.

It is but natural to inquire how this balance works amongst commodities. In this case are production and consumption also equal or nearly so? At once the dogma is advanced that demand creates supply and supply creates demand, but this has nothing in common with the sug-

gested balance; it is in fact an absurdity, and sounds as if it had been invented by a baker's assistant, who, while in the bakehouse, noticed that whenever the scales were down at one end dough was plumped down on the other, and while in the shop he noticed that the supply of loaves was balanced by weights put in the other pan. Everybody demands gold, but who supplies it? There is an abundant supply of salt in the sea, but who consumes it? There must have been a demand for wrought iron and for steel, for when engineers discovered methods of supplying these materials they at once came into general use, but for centuries there was no supply. On the other hand there seems to have been no very large demand for aluminium, for although alumina is infinitely more abundant than iron ore, and though the process of manufacture is now very simple, the demand is not growing in proportion to the facilities of supply. Silver too is much more abundantly mined than formerly, but if possible the demand is growing less. Little can be urged against the assertion that there is a balance between production and consumption. Consider the ten thousand years or more that wheat has been grown and has been consumed by say one, or two thousand million people, and compare this amount with the world's available wheat stores before harvest. These will probably not amount to a hundredth per cent. of the total supplied. It is the same with nearly all commodities; just so much is produced as is consumed, just so much is consumed or wasted as is produced.

A study of temporary discrepancies is of the nature of adjustments and corrections of mechanical balances, and like these they should lead to discoveries. In fact, one subject, the frictional loss in money matters as represented by savings and reserves has already been mentioned. Now these reserves have not only the function of lubricating the balance, but are also of the nature of a fly wheel, which is the second analogy selected for discussion.

The object of a flywheel on an engine shaft is to effect a balance between the driving power and the power consumed. A revolving flywheel represents a certain amount of *vis viva* or energy; if temporarily the engine produces more energy than is consumed, the flywheel revolves faster, and thereby consumes the excess energy which it gives out again, either when the engine power is reduced, or when the consumption of energy has been increased. The flywheel obviates those sudden jerks which are the reverse of smooth working, in fact, single crank engines could not be made to revolve without a flywheel, because at the end of each stroke of the piston there is no available power to carry the crank round. Now reserve capital is of the nature of a flywheel in the commercial world in that it balances temporary differences of supply and demand. It is well known that as long as stocks are large, prices are steady, not low, as is generally believed. As soon as stocks are reduced below the customary level, prices go up, not because of the actual scarcity, but because scarcity is known to make markets excessively sensitive and unsteady. Seeing that stocks have to be paid for with the interest and storage dues, they are naturally kept as low as possible, and during long continued normal times they are apt to be reduced to below safe margins, so that when excited times arrive fluctuations of prices are excessive.

This was the case as regards gold during the recent American crisis, and commercial men are even now wondering whether the English gold reserve, which is still what it used to be ten years ago, is as large as altered conditions demand. Will it in troubled times have the same steadying flywheel effect as it used to have? It must be remembered that not only has trade increased enormously, but the available amount of gold has grown, and the Bank of England stock is therefore now relatively small.

Another branch in which capital has a steadying effect,

one which is utterly ignored by the working population and by communists, is the labour market. If mills and workshops had not reserve capital, if they were heavily mortgaged, as is unfortunately the case with some, no work could be undertaken except against orders. Take for instance the case of a cotton mill without capital. No cotton could be bought, no wages paid if there were not an order for these goods which could be shown to the bank, when people wish to borrow money for purchase of raw material and for wages. It is a common experience that during bad times no orders can be booked, and if all the mills were worked without capital, all hands all over the country would have to be turned out during such periods. Under such conditions the English workman would have to learn to save against bad times. At present the saving is done for him by the capitalist, but naturally not for his benefit.

The flywheel steadying effect of capital is, of course, not as simple as sketched above, more especially as its one function seems to be the counteracting of the speculative spirit which actuates large numbers of farsighted men; but confining attention to the above mentioned cases of factories and mills, it would almost seem as if it would be a beneficial act on the part of the State to hold out inducements for the accumulation of stocks of at least staple goods. These would have the effect of steadying the rush of buyers during improving times, which force mills to be worked at fever heat and to produce more than is being consumed, and when the demand on the mills slackens the workmen would by rights have to be dismissed, or work undertaken at a loss.

One point about capital has to be borne in mind; if it has to act like a flywheel it must be readily available. Like the energy stored in a revolving flywheel, which is always keyed direct to the driving shaft, capital must be within immediate reach when wanted. Stocks of gold can, of course, always be used, and for that reason both

France and Germany hold large reserves against the outbreak of war. Consols and other dividend bearing securities, as they are readily convertible into gold, are equally good reserves, except during really troubled times, for then everybody requires money for one purpose or another, and all sorts of securities are thrown on the market and lose their value. Increased gold reserves would counteract this tendency. The largest amount of capital in every country is doubtless invested in land, yet because land was practically at one time the only property, our legislators of the past have saddled it with a host of antiquated laws which make it difficult, especially in England, to convert it into money. Many lands are entailed, and others, except in small districts, are not registered, so that before a sale can be effected title deeds, reaching back into antiquity have to be produced. Then also, as land is irremovable, and as nearly all governments are fond of trying taxing experiments on this form of property, intending purchasers feel no great confidence as to its apparent value. Yet seeing how great is the commercial advantage to every country of the flywheel effect of a large reserve capital, available at any moment, there can be little doubt but that the unlocking, as it were, of land for financial transactions would add materially to the wealth of the nation. By some wonderful logical gymnastics communists try to convince themselves that land would be more valuable to the state if owned by the state, whereas the experience with Mohammedan states where this principle has now been in force for 1,300 years shows, without the necessity of a proof, that state lands soon revert to their prairie value and entirely disappear as property.

In order not to over-burden the next chapter on state functions, the following slight digression will, it is hoped, be pardoned. The absence of the saving instinct in the poorer classes has been referred to. Those people are poor who are thriftless, and have no saving instinct. A

man who, from his earliest days, can save even only five per cent. of his income will grow to be rich, more particularly if, with increasing pay, he saves larger proportions, and his children, if they inherit this trait, will start with being well off and end with being rich. Workmen point to the discrepancy between their 20/-, 30/- or 40/- wages and the hundreds and thousands of pounds income of the rich, and ask how it can be possible to live on their earnings and also save? And yet if wages go down they live equally well on reduced pay, and if wages go up they live no better, but spend all, or if they cannot spend all, they stay away from work. Not only is this the case, but people who live amongst them, Scotchmen, Jews, Chinamen, Japanese, and others are looked down upon and despised because they can and do save on even smaller pay. It is impossible to say whether this condition of things can be changed, but the wonder is that whole nations have this non-saving trait. It might be imagined that during the thousands of years that agriculture has been carried on, the necessity of thinking in the spring about stores for the winter would have resulted in evolving thrifty races. Certainly the Jews, the descendants of the farming Babylonians, are thrifty, so are most Orientals who have carried on agriculture for hundreds of generations. Is it possible that the tribes from which the Irish and English have sprung were not agriculturalists for any length of time? Were they merely huntsmen like Abel, and will they suffer at the hands of Cain? Did they let their wives think and slave for them? That may have been the case, but it is also possible that our ancestors have for many past ages lived in states which were constantly at war with each other, and that in such states savings would be either swallowed up by the state or captured by the enemy, while in times of scarcity supplies would be hoped for from a raid into another district. Under such conditions no saving instinct would be likely to develop.

Have things been improved during historic times? Hardly! Serfs and slaves were never allowed to hold property, they might toil, but only for others, and it is their descendants who now constitute the bulk of such states. If, in some communities, saving tendencies were encouraged, this was either done for the benefit of the state, which took in taxes what it refused to allow the upper classes to appropriate, or else the prosperity of such a community invited incursions from surrounding thriftless ones, whose robberies were drastic lessons against thrift. To see a parent's lifelong savings swept away in a day is a lesson in the art of spending freely, which is not likely to be thrown away on the majority of children.

Are modern states doing anything to encourage thrift? Workmen know full well that the sub-state—Trades Unions—is a harder taxing master than any official rent or rate collector, for not only does it take every surplus, but it actually fixes the limits of income. It gives no educational advantage to the children, no marriage dot, no capital for the boys to start on, no relief to the orphan family. Trades Unions give only the excitement of a strike now and then, and the living on half pay, thereby proving on how little a workman can live and that his contributions ought always to amount to the half pay which he does not get. If an increase of wages is gained by the Union, overtime and other means of augmenting the official income are rigorously prohibited, and to make matters worse, both rents and the prices of foodstuffs invariably rise in proportion to any increased income. And why should it be different as long as the workman spends all he gets? When there is a surplus, the shopkeepers, rent and tax collectors fight for it amongst themselves, because the workman will not hold it. No wonder that all tendency to save is smothered. No wonder that the once independent British workman, whose habits were modelled by the old guilds, is rapidly sinking to the condition of a discontented communist. He feels that he has

reduced himself to the condition of the ancient slave who could not save if he would, at least in some countries, and very much like a man, he blames everything and everybody but the true cause, which is his disinclination to persist in saving a paltry shilling out of twenty.

The larger state exerts almost the same discouragement. It is certainly the wish of the people, as expressed by various Acts of Parliament, that every individual should save. There are the savings banks, and the limited liability companies into which money can be paid without the risk, as in former days, of losing one's all; there are the bankruptcy laws which allow the unfortunate business man to start afresh, but somehow the administrative side of the state allows these measures to be used for the purposes which are in direct opposition to the objects for which they were passed. The working classes are not induced to entrust their money to the government or to the limited liability company. These, instead of benefiting the general public, seem almost to have been devised for the enrichment of company promoters, and of a few shrewd directors; and the bankruptcy judges know that only too often they are being asked to give relief to men who can pay but who have placed their property out of the reach of the courts. And then there is the tax collector. Whenever he scents a class of men who are saving money, he gets the law adjusted to snatch it from them. Those who through their own exertions have got on in life are heavily fined for possessing saving qualities. While active, they pay heavily for earning money, when they retire they are fined still more heavily for having saved, and what remains of their hoardings is seriously reduced by the double impost of legacy and succession dues. A man has to pay for municipal undertakings which compete with his own, he pays for the inspector who worries him about smoke and unionist factory conditions, he has to pay for roads and trams which spoil his property, and what perhaps is the hardest infliction, he has to pay for

the education of a lot of children on lines which he is not allowed to control and which seem to produce anything but good citizens, and at the same time he obtains no State relief for the education of his own children, because he will not send them to schools where refinement and culture are unknown or despised.

It is unfortunately only too true that States are controlled by single substates which aim at attaining power, like the ancient robber knights, only in order to lay hands on the savings of others. No wonder that the saving instinct seems unable to develop.

Without in any way disturbing the previous remarks the reminder may here be inserted for the benefit of the communists who wish to distribute money uniformly, that, although they hardly understand its indication, money is probably the most accurate scientific balance or measuring instrument which political economists can employ. Money is an invention for facilitating barter or rather converting it into purchases, but it seems also to be the measure by which most things are being measured. Time is money, success is measured by money, comfort and happiness, gifts and accomplishments are measured by money, property and its fluctuations are measured by money, and money itself is measured by money, as for instance, interests and bank rates. Adam Smith may have taken this for granted when he wrote about the wealth of nations, but wealth does not make a nation any more than a hundred balances would make a chemist, or thousands of feet of chain and tape measures would make an engineer. These are merely instruments, and if gold should be found to be the most reliable instrument in political economy, let it be adopted, but this science should not be based on the assertion that it reveals the means for acquiring gold or wealth.

Turning now to the last of the three suggested analogies, or balances, it appears that the sun's heat evaporates the surface of the water of the oceans, the winds carry it

inland, where it falls down as rain, part of it flows back to the sea, part of it is re-evaporated and re-deposited further inland right up to the highest mountain ridges. The rainfall can be measured, and also the volume of the river water and less accurately the water which flows underground. The disturbing element, the amount of re-evaporation is approximately known, and in any case it is certain that sooner or later all the water carried ashore will have flown into the sea again. Here too production and consumption are equal. Re-evaporation may be effected by surface conditions, such as the presence or absence of forests, which would mean that by cutting down trees man may change the volume of water coming from the hills, and that he, or volcanic and other forces, may divert the courses. This has often happened in China. Man may dam up the Nile, and other rivers, and for a time stop their flow entirely. Mining engineers may cause springs to cease to flow, man may utilize the power of the natural river after damming it up, but the balance between total evaporation and total discharge, between production and consumption is not affected. A stream which flows from thousands of springs cannot be stopped by man.

Let this example be applied to the flow of a single commodity like grain. Millions of farmers in America represent the springs, and millions of mouths in England are the sea which swallows up this stream. Production and consumption are equal. Suppose now that an ambitious warrior should wish to fix his turbine in this stream, and take some of the vast amount of power which he sees in it for his own purposes. He will erect a barrier of protective import duties in England. Suppose that, in the stupid hope of reducing the power of the stream of grain, an export duty were now imposed in America, what would be the result? A stoppage of the flow, will perhaps be the answer. Not at all! The millions of farmers in America would not cease growing corn, for if they did their

labourers would have to be discharged, and a fearful crisis would ensue. No, the stream would not cease to flow from America, the farmers would merely have to take lower prices, the speculators, the railway and shipping companies would have to take lower freights, but none of these three interests would for one moment think of letting the old stream stop, or if they did, it would merely overflow into rival channels. Besides, as corn growing in England is very expensive, partly due to land burdens, partly due to transport expenses, partly due to dear labour, caused by the manufacturing towns, the price of corn in England is much dearer than it need be. It is this high price which permits foreign growers, carriers, and speculators to make high profits. These would have to be reduced before the stream ceases to flow. Supposing for argument's sake that Communism had been adopted, and that capital had practically disappeared, and that, therefore, no reserve would be available to increase the workman's wages, then he would have to live on what he used to earn before the barriers were erected, and if he ate less, there would soon be such a surplus of corn in America that prices would be as low as ever and he would live as cheaply as before. The workman's income and expenditure are equal; this seems to be true, but whether this is a convenient scientific balance is another matter. A disturbing influence, but only from a theoretical point of view, is that the English masters have capital, and that they would assist their workmen by increased pay even at a loss to themselves; even then, however, the flow from America would not be disturbed. There is much absurd talk afloat as to who pays any increase of taxation. Why the producer of course. The consumer, including of course the import collecting state, merely consumes, and therefore finally, no matter what taxes may be invented, these are always ultimately paid by the only people who can pay, by those who produce wealth. Middlemen merely adjust wealth and are perhaps more

easily taxed than the manual workers, but it is only they who create wealth, who can pay, and therefore it is only they who do pay.

No other country than England has had more frequent and drastic experiences of the truth that it is just as difficult to stop a trade stream at its source as at its discharge. The producer insists on producing with the same vehemence as the consumer insists on consuming. Napoleon tried the grand experiment of erecting his European Trade barrier against England, with the result that the English producers were practically starving and willingly spent £600,000,000 in order to obtain the privilege of working for the Continental people and supplying them at lower prices than they could make their goods. Then there was the great Cotton famine which nearly led to our taking sides so as to obtain the raw material which would provide Lancashire spinners with work. Less drastic, but nevertheless, most serious reminders in the same direction were offered by the McKinley Tariff and every subsequent one. We, the producers, were at first thrown out of work until starvation led to a lowering of wages. Exactly the same process would be gone through by the American farmer if his productions were taxed, he, the middleman, and speculators would have to pay or else a huge farmer population would be thrown out of work. After a time no doubt a change would take place, the American farmers would try to find other markets and many other matters would readjust themselves, but all this would take time, at first the stream would flow as it had flown. Ambitious statesmen, of course, reckon on tapping the stream continuously in order to increase their power, but they often find themselves mistaken, though if they erect barriers merely to divert a stream, they may realise their object. This seems to be the ideal which sways English Imperialists. Streams are flowing between ourselves and other countries. Some are being tapped for hostile purposes, others are being dammed in

the hope of drowning us out. What could be more natural than that England too should erect, at least, protective embankments which might divert these streams to flow between the various members of our Colonial Empire?

Here the subject touches on practical politics, about which everybody of other ways of thinking is supposed to be biased, and the impartial thinkers are reduced to silence, and rightly too, for as long as political economy has no single balance and is no science, it is about as easy to arrive at correct conclusions as it is to do a multiplication sum in Roman numerals.

No wonder that, when important economic questions arise, political economy doctrines are despised. At best they are picked up for inflicting temporary injuries on opponents as we might pick up any stray stick with which to drive off an objectionable dog. This can be illustrated, without breaking a self-imposed rule, of not taking sides in politics, by mentioning one taxation question with regard to which both political parties have evidently got hold of the wrong sticks and have overlooked the reliable support which is lying in the gutter. The Unionist party timidly, but wrongly, admits that a duty on corn will certainly raise its price, and it offers as a set-off to commit the state of immorality of encouraging the drinking instinct of the people, by taking off the duties on tea and coffee, nerve exciters and digestion destroyers. It is difficult to see the reasonableness of the proposed action, but it is equally difficult to see the logic of the Radical procedure of adding to the taxation of the farmer in order to reduce the price of corn! Although this is a political economy question, the general public, who have not studied its partisan dogmas, will prefer not to have it treated from an academic but from a common sense point of view, which may briefly be summarised by saying that the price of corn is not regulated by those considerations which fix the prices of collectors' stamps, works of art, etc.,

but by the more simple experience that as long as neither the producer nor the consumer can produce as much as the latter requires, the price of any commodity is fixed by the cost at which the consumer is producing it, and it will sink to the level at which the outsider produces it only if he is capable of producing all that is required. Encourage the rest of the world to produce more corn than England can consume and competition amongst outsiders will bring down the price until it will not pay to grow a blade of grass in England, but until that condition is reached the minimum price of corn will always be higher than that at which it can be produced here. On the other hand, as long as it is more expensive to grow corn in England and transport it to the leading markets than it is for foreign countries to do so, so long will the foreign farmer and many intermediaries, including the millionaire speculator and the thriving provision merchant, make huge profits out of the difference. That the price which the foreigner can obtain in England will rise if the English producer is hampered, has already been proved by the rise in the price of food occasioned by the mere threat of land taxation, and yet no political economist has got up and explained that as we import twice as much as we produce, every one million pounds got from the farmer means two million pounds paid by our people to foreign farmers, speculators, and intermediaries. If, on the other hand, the plan were adopted, which, however, has not been proposed either by the Radicals or the Unionists, of taxing imported corn in order to devote say one half of the income to the farmer's relief and a corresponding reduction of price, then as the foreigner can still produce cheaper than we can, he will find it profitable to continue sending us corn in spite of a lower market and in spite of an import duty, so that, paradoxical though it may sound, the imposition of an import duty on corn, of course by a business Government, can be made to result in a reduction of price.

STATE HARMONY.

HAVING indicated what there is about a state which suggests a personality, a character, an instinct, or a tendency, and having attempted to liken the educational system of a state to the intellect of an individual, it seems desirable, before plunging into the complicated inter-action of states, sub-states, and individuals, to recapitulate, as was done when dealing with personal ethics, the various manifestations of Energy or Life to which preceding chapters have been devoted.

Starting with the assumption that the essence of life in its broadest sense, is a dualism consisting of matter and energy, it seemed as if matter were of a sluggish nature, and could exist singly in a sort of death sleep, whereas energy appeared to be a restless something, possessed of an everlasting striving to be independent of sluggish matter, and yet incapable of existing independently. Its goal seemed to be an illusory one, but nearly attained by the higher manifestations, such as human life, and by inventions or ideas. The latter are freed from matter, but they are also without independent energy in them. The winning post seems to have been reached by the lifeless racers. If state life be also a manifestation of highly specialised energy, it would follow that a perfect state is one which reflects the true strivings of energy in its manifestations. If the efforts of individuals and of states, that is, their lives, are not in harmony with the strivings of energy then they are wasted; and conversely, wasted personal or national lives have not been true to themselves, not true to the strivings of energy, of which they are the manifestations. While glancing at the simplest manifestations of energy, at physical force,

vis viva, attraction, heat, light, electricity, etc., a tendency was noticed in energy to dispense with matter as far as possible, or in other words to economise, and this great principle of economy seems to be the dominant note in all the more highly specialised manifestations of energy, even in life, in which there is a feeling of pride when great results are achieved by insignificant means. Very low down in the scale of manifestations, for instance, in chemistry, catalytic energy appears. Individually weak, it is yet so highly specialised, compared with still lower physical forces, that it can bring about reactions between substances which have, as it were, the power but not the skill to attack each other. This form of energy, also reappears again and again in all higher manifestations, even in state life, where, for instance, Alexander acts as the catalytic agent which brings about the longed for conflict between the Persians and the Greeks. Advancing a step further, a more highly specialised form of energy, is recognised as cell energy. In its millions of different forms the new principle, of what is called life, is similar to catalytic energy in that it initiates reaction between less highly specialised manifestations of energy, but differs from it in that these reactions are of a forced nature, opposed to the strivings of these lower forms of energy, but in harmony with its own striving, a more specialised one, which is generally its own reproduction or the continuation of life. Cell energy utilises the sun's light and heat, which would otherwise merely warm the Earth, and it takes advantage of the presence of carbonic acid, moisture and minerals, splits them up and creates cells and a host of chemicals which chemists, with all their wonderful appliances, are as yet unable to reproduce. A chemist who ignites an explosive mixture of hydrogen and oxygen is essentially a catalytic agent, but when he utilises the electric current to split up water into hydrogen and oxygen against their wishes, he represents Cell Energy.

The life principle, as exemplified in cell energy, directs the forces of nature to work for its particular objects. This manifestation of energy, like previously mentioned ones, reappears over and over again in more highly specialised forms, and there is little cause for surprise when it is recognised in the motto of the Engineering profession, as represented by the Institution of Civil Engineers: "Civil Engineering is the art of directing the great sources of power in nature for the use and convenience of man." When this motto is extended to states, it should read, "Statesmanship is the art of directing the powers of animate and inanimate nature for the advantage and improvement of the State."

Some individuals like Alexander, Cæsar, and Napoleon, acted in a double capacity. They were catalytic agents in so far as that they started reactions which were brewing, but no sooner did they feel their own power of directing forces of animate and inanimate nature, than their energy changed to the higher type of life energy and, like true statesmen, they laboured only for what, in their eyes, was the supreme objective, the Glorification of the State.

The State motto suggested above is incomplete, in so far as that it gives no indication of what constitutes the improvement of a state, but on glancing back at Evolution, which may be called a relatively highly specialised manifestation of energy, it is seen that its principles are active in all branches of life and likely to be a dominant factor in states. State improvement, therefore, may mean state evolution, though this is not a certainty. Now a very cursory glance at the Palæontological table previously given, and especially the frequent notes in the table about animals becoming extinct in this or that stratum, shows that not all forms of life which evolution had once created and improved were capable of adapting themselves to changed conditions. Of about 120 orders of fossils there mentioned, the most ancient ones, the

Trilobites, expired before the coal measures were laid down. The Graptolites became extinct in the Devonian period, and many other and later forms, especially the wonderful monster amphibii of the Trias, have not survived to our day. These forms, in contra-distinction to others, were unable to exist under changed conditions of life, and they must have been unable to adapt their constitutions to these changes, and therefore died out. These animals may reasonably be looked upon as evolutionary failures. Theirs were, perhaps, cases of ultra-development, like the Irish elk, like domesticated animals, like overgrown states.

In the evolution of states, similar failures have been the rule, with perhaps the one exception of China, the oldest existing and almost unaltered state. Rome lived a long and great life because it had the power of adapting itself to its altered conditions, but it did not survive the human deluge of savage Germanic tribes, which poured across the Danube and Rhine. Rome started on the non-progressive Greek lines of exclusiveness, but circumstances soon made it the protector of surrounding tribes. In conflict with the Carthaginians Rome again changed into a great trading Empire and maritime power. It also survived and adapted itself to the change from Paganism to Christianity, but its constitution could not be altered still further so as to make Rome the guiding spirit of Northern Europe. Had Rome possessed the gifts, or had its traditions allowed it to develop the methods of dealing with savages which during the Nineteenth Century were adopted by England, Rome might perhaps have persisted to this day. It was wanting in this respect, and it disappeared.

Now, although there are only a few orders of animals which have become extinct, the number of species which have disappeared must be innumerable, for there still exist about 400,000, and it is probable that these have been evolved out of only a few forms of an equally large

number in each geological period. Possibly the lowliest of each family survived through altering conditions, developed and gave rise to a number of new species. Evolution acts like a potter, who throws away, as it were, the vase which would not grow into the desired shape, and, taking a handful of unshaped, and therefore less specialised material, makes a fresh start. The Arthropoda with their complicated eyes, their protective armour, their wonderful instincts, and the power possessed by some of them to live several lives, once as grubs underground, once under water as larvæ, and then as flying insects in the air, are unquestionably amongst the most wonderful creations of Evolution. But this family soon reached finality; like the Chinese Empire it remained always the same, and no further evolutionary development seemed possible. There is no need here to seek for a cause, but probably the necessary frequent shedding of the protective shells, whenever these animals increase in size, is too great a constitutional strain to allow of further improvements.

Evolution having admired as it were this, its *chef d'œuvre* of the Carboniferous age, seems to have felt disappointed that it would not go on improving, and even before the Triassic period was reached, evolution had taken a new handful of unshapely primitive clay, and was engaged in moulding the mollusc family. It had caused it to develop real eyes instead of multicellar ones and to surround with protective shields, not the bodies of its individuals, as in the case of insects, but only their vitals. By slow degrees these cases seem to have been converted into the spines of the vertebrates. After millions, perhaps hundreds of millions of years, man, the *chef d'œuvre* of the present age was evolved. Will he share the fate of the insect tribe, rapidly attain perfection and remain unchanged through future ages and surrounding changes, or will he develop into something nobler and still more highly specialised? Some of

our poetic philosophers do not seem to think so. Dean Swift throws man overboard and believes in a superior improvement of the horse, and Bulwer Lytton, in his "Coming Race," pins his faith to the more lowly frog tribe. It is strange that no one has yet thought of the bat as being capable of development. Endowed with wings, and, as some believe, with a sixth sense, superiority over man might easily be evolved, at least in a novelist's imagination. Then, too, there is the torpedo fish, with its electric powers. Could not these animals develop so as to communicate with each other by bodily wireless telegraphy, and could not this imagined power be improved so as to surpass man's reasoning process?

The throwing away by the potter of the unsatisfactory vase and starting afresh with a less specialised subject, the lump of clay, the abandonment by Evolution of ultra-developed or stagnant families, and the bringing forward of more lowly forms, find their counterparts in the evolution of states. Constitutions are slowly evolved out of patriarchal, communistic, or other conditions, those which, by some accident contain the essentials of success, attain to a flourishing condition, which only too often is mere ultra-development, while others are surpassed at an earlier stage of their existence. New states are continually being formed out of the, as yet, unshapely mass of human discontent, and only occasionally do these attain the perfection and endurance which can earn for them the appellation of lasting states.

Long-lived is only that state whose constitution is robust and capable of adapting itself to altering conditions, so that from this point of view most states must be declared to be very imperfect organisms, and it is to be feared that states with fixed constitutions cannot adapt themselves when conditions alter. Their rise and decay is sometimes so rapid that they can hardly be thought of as having been evolved, and they are therefore more often likened to individuals having a birth, life, and death than to a

species which evolves and which does not disappear until external conditions change more rapidly than it can follow them. Yet amongst the most lasting states, like those of Egypt, Babylonia, China, and Rome, the methods of evolution are clearly discerned and a careful study of these cases will reveal that, although these states were controlled by far-seeing statesmen, and have apparently been developed on reasoned lines, yet in reality they have been merely evolved by a power which seems to be quite as blind as animal evolution. Internal changes and external influences, have had lasting effects. Statesmen may have battled against them, and may have been successful, but even such successes would always constitute changed conditions, and many cases might be cited where trifling incidents, notably the births or deaths of reigning princes, the appearance or non-appearance of a leader when wanted, and friction or harmony between different parts, have had far-reaching consequences. The dying out of the Tudors consummated the dream of earlier English Statesmen by joining England to Scotland. The Campaign of Belisarius in Northern Africa paved the way for the invasion of the, as yet, uncreated Mohammedan power. Constantine's change of the legion system of the Romans, whereby his reign was safeguarded, increased the tendency to employ German mercenaries, and by dispensing with the Romans, helped to end their Empire. Gladstone's sale of Vladivostock harbour to Russia was the initial impulse which led to the Russo-Japanese War, his refusal to purchase the offered Delagoa Bay was the initial cause of the South African War.

The possibilities associated with the evolution of animals and states have been mentioned here, merely in order to suggest extreme caution to all constitution builders and menders, and to revolutionaries, for one or the other direction in which they hope to move the world, may result in progress or reaction, stagnation, increased life, or national death. It may mean mental or bodily

advancement like that respectively of the Athenians or Spartans, or stagnation like that of the ancient Egyptians and the modern Chinese.

On the other hand, it seems even more risky to be guided by the *vox populi* than by individual men, for although the public view has often been appealed to in these pages, that was done merely with regard to the definition of two words; immorality and crime. The *vox populi*, the nation's voice, is one of energy's manifestations, not its essence, nor its interpreter, and it often deals with state matters in a way which in single individuals would be either called flippant or reckless, as was wonderfully exemplified during the French Revolution.

Having sounded these warning notes, states may now with more safety than before, be dealt with as if they were individuals, and an attempt can be made to define state happiness as being conditional on perfect state life. It has already been mentioned that states consist of substates, such as nationalities, castes, professions, men, women, and children, which together form one whole. To be a perfect whole they should form a harmonious whole, and that seems to have been the ideal of all statesmen of all ages who are counted amongst the great men of the world. But their views have not always been comprehensive or lastingly practical, and the difficulty of effecting a union has, as was illustrated by Germany, generally been so great, that the more important establishment of harmony has often not been attainable. But union without harmony is marriage without love and is worse than a disease

The Turkish Empire illustrates how difficult the task must be of harmonising a crowd of nationalities, and the Austro-Hungarian monarchy, with its nameless composition of thirteen states, each with its own language, is a monument to the administrative abilities of the Hapsburg family, while Germany illustrates that only the mailed fist

of an alien power can unite tribes, which in spite of their professed unity of race, are a very heterogeneous crowd. The Prussians are a Lettish race, and Posen and Silesia have Polish affinities, all three are therefore Un-german. Even the Germans are divided amongst themselves into races, amongst whom those with straight noses and long heads suggest descent from Scandinavian ancestors, while others with their squat faces seem to be aborigines of the mainland. Contrast in fighting qualities, the only comparative information handed down from the Roman times, is still as marked as ever, and showed up wonderfully during the Franco-German War, whole districts like the Rhine Provinces contrasting as regards courage from adjoining ones like Bavaria and Würtemberg. The Swedish (Gotland) origin of Goths, Jutes, Jutungs (Suabians), and Sueves, is almost established even by these names, while differences of origin are accentuated by reports of ancient characteristics of a few tribes. Little is known about the Kimbers and Teutons, except that they were enterprising and brave. The East and West Goths were brave, noble, and honest. The Franks (Bavarians) were quarrelsome, cruel, savage, and treacherous. The Vandals (or wanderers), probably related to the Goths, were noble and very enterprising. The Saxons were brave and cruel, unenterprising, and steadfastly adhered to their constitutions which dispensed with Kings. The Longobards were highly honourable and poetical. The Taifals were barbarous and sexually immoral. The Chatts (Hessians) were noble but unenterprising. The Herules were treacherous, fond of servitude and drink. The Angles were enterprising traders, and industrialists. The Jutungs (Suabians) were fiery soldiers, etc. Seeing that the general characteristic of German peoples is to differ amongst themselves, it is hardly to be wondered at that it took a long time and an iron hand to weld them into a single Empire. Whether it can hold together when the superior Germanic element attains the same power as the

present Prussian or Lettish element, will show itself in the future.

Englishmen speak glibly, almost with pride of the composite character of their nation, but this is hardly a correct definition. A small minority consists of Gaels, Celts, and Iberians, who are possibly very closely related, and may have arrived before the Straits of Dover separated England from Europe. The Welsh are probably a mixture of ancient Iberians and Romans, the name Welsh or strangers being by ancient Germans applied indifferently to Welsh and Italians. All these were driven into mountain fastnesses by successive invasions of closely related Angles, Jutes, Saxons, Danes, by those Norsemen who came direct from Scandinavia, and those who had first settled in Normandy. If the Saxons, whose type is very similar to that of the Swedes, are related to these, then practically the English race is uniformly Scandinavian, and what is more, these invaders seem to have been carefully sifted for quality before arriving, for those who came to England must have been the enterprising, resourceful seafaring portions of the several tribes. The lowland Scots are doubtless, too, of Scandinavian or Germanic origin, but they arrived before the Roman times, and prefer to be identified in name at least with the ancient Britons, although it is probable that the only connection of these early invaders with the aborigines is that they furnished the latter with leading families or heads of clans.

England proper is peopled with North Germans and Scandinavians, which are nearly related tribes and which have again become thoroughly mixed. Fifteen hundred years ago it was not the custom for a conquering tribe to grant constitutional governments to a vanquished foe. Those men who were not exterminated on the battlefield, where hundreds of thousands sometimes perished together, were shipped away as slaves, and when a Baltic tribe settled down definitely in a district none of the

aborigines remained. The continental Saxons went even so far as to create a wilderness around their settlements. The first results of invasions of England would, therefore, be that the ancient Britons, mixed with Italians, would concentrate in Wales, and as further and further tribes landed from other districts on our shores, the first comers, instead of forming independent nationalities, as the Germans did on the Continent, would again and again be huddled together and gradually welded into a homogeneous whole. This refers to the Saxons, Danes, and the first lot of Norsemen. The second lot, which first settled on the coast of Charlemagne's kingdom and particularly in Normandy was, during a period of five or six generations, familiarised with what remained in France of the Roman civilisation, and when William the Conqueror brought them into England, the ancient practice of exterminating the vanquished was out of date. The Scandinavians who had rested awhile in Normandy, soon inter-married with those who had come direct from home, and also with the related Saxons, and though a period of only about twenty-five generations has elapsed since then, the process of mixing has been very effective, so much so that the English nation, not counting the Welsh and Gaels, is a very thoroughbred race. It even seems as if the English nation has always been conscious of this unity and has acted as one whole, for the Northumbrian attempts to set up a separate kingdom were merely imitations of the Bruce's unhappy revolt, which set back the clock of Scottish civilisation by 500 years.

One of the difficulties in the way of British unification has been the tendency of various tribes to localise. The Scotch, Welsh, and Irish remain stationary in Scotland, Wales, and Ireland. In recent years engineers have invented means of locomotion which should be means of amalgamation, but, although these have been in use for two generations, they seem to have produced very little effect as regards amalgamation, whereas such trifles as

local accent, manners, personal uncleanliness, etc., have tended powerfully to preserve purity of race.

The great towns, paradoxical though this may sound, also tend against amalgamation. They are like sinks which drain the superfluous population from the country districts, leaving behind a prolific and relatively pure parent stock from which, generation after generation, true born English, Scotch, and Celts emerge, flowing into the towns, as into narrow funnels. In the whirl of town life a little mixing does take place, but, the resulting generations refuse to return to the country; they are relatively sterile, and a very large proportion is drawn off to the Colonies.

The attempt of Nebuchadnezzar, and more recently of Russia to effect amalgamation by transportation of whole tribes does not appear to have led to any unifying result.

The unification of heterogeneous tribes seems almost impossible, and those statesmen who have insisted on carrying out the idea of state unity have had to resort to exterminations. Thus the Greek townlets were homogeneous nations, but only because they allowed no strangers, nor their children to become citizens. They even killed off their own superfluous population. The ancient Germanic tribes enslaved or exterminated the aborigines of the tracts on which they settled. Only the Arabs hit on a wonderful but really effective process of unification. There probably never was and never will be such a rapid unification as occurred in North Africa about 700 A.D. The then existing population was Egyptian, Greek, Phœnician, and Roman, with a recent admixture of Vandals, Goths, etc. The Ethiopians were, of course, slaves, and did not count. A horde of Arab males overran the country, making slaves of the men and wives of the women, and, hey'presto! the next generation was Moorish and the faith Mohammedan. But even this unification did not spell harmony, for states are torn asunder

not only by nationalities, but also by conflicting interests, and these are innumerable.

There are the rural and urban populations, the industrial, the merchant class, the moneyed class, holders of real and of personal estate, the professions, including the bureaucracy, and such castes as the aristocracy and the Jews, to which might be added certain branches of the services and trades unions.

Castes have their own laws which hold their own even against the law of the land. For instance, according to English law, no one is allowed to hinder another man from learning a trade, yet if any Dublin lad, whose father or uncle is not a Dublin cooper, wishes to learn how to make a cask, he will find all doors closed against him. That particular trade is looked upon as being the exclusive property of one small caste. It was the same with the English Glass Blower Caste or Union, which committed suicide some years ago by refusing to blow any more, although the wages were fabulously high. In general, Trades Union influence has already set so strong against improvement and possible regeneration that it is now more easy for a labourer to rise to the position of a Cabinet Minister than to acquire the knowledge of a skilled trade.

Other sets of sub-states are the military, naval, and bureaucratic ones, whose interests centre in promotion and increased pay. They are generally in conflict with all other sub-states, for these have to find the money. This was not the case under the feudal system, but that had interests of its own which have brought ruin on many nations. Then there is the interest of the farmer who wishes to have a steady market in which to sell his produce. The merchant's interest is to have general security of goods and money, and to a certain extent stability of markets, but if he can secure a monopoly either by availing himself of protective duties, bounties, patent laws, corners, scares, etc., he does not trouble himself whether

this is bad for general trade, whether whole industries are crushed out of existence and thousands of men and women are or are not out of work. In modern days there is for him the consolation that the poor rates and old age pensions provide relief for the workless.

The manufacturers naturally have their own interests. These harmonise to a certain extent with those of their workmen, *e.g.*, cheap food; for after all, the cost of living of the working man, who spends all he earns, is the chief item of the cost of production. The manufacturer also asks for cheap houses, and that again means cheap land and low rates. Cheap raw material and cheap food mean free imports, and that, of course, means the closing of home mines, and the killing of the agricultural industry; for it is cheaper to mine in unworked ore deposits than to delve deeper into our honeycombed metaliferous regions, and untaxed virgin soil in warm climates produces cheaper grain than can be grown here. Cheap house rent means antagonism to the ground landlord and to the house owner. Those few manufacturers who own their surrounding lands can do as they please, they can either let their workmen live cheaply, pay them small wages, and make large profits out of their works, or they can run their works at a loss, pay high wages and make a profit out of their rents. It seems strange that amongst the number of political experiments which have been tried of late by self-governing colonies, no attempt has been made towards cheaper living. On the contrary, either intentionally or by accident, the cost of living is dearer in the Colonies than in England. It may be wrong from a political economist's point of view, but it strikes a layman as if the gold miners, first of Australia and then of California and now of South Africa, could have earned more, if the local cost of living had been lower, or in other words, if farmers had been encouraged to settle down around the gold-field. As it is, Europeans living in these districts have to spend princely incomes on their bare

subsistence, and as income and expenditure about balance each other, working Colonists can now only be attracted by ruinously high pay.

The general subject is not as simple as might be imagined. Cheap living means dear and scarce money, and even though trade barriers might create such an ideal condition of things, no state could embark on this policy unless it could arrange that in its dealing with other states it should not be crippled as regards money and credit.

It is thus abundantly clear that the task of harmonising the conflicting interests and sub-states which form a united state is practically impossible, except under such conditions as existed in the Greek townlets. Amongst them a large number of the population, the slaves, did not count as part of the state. Yet even there, where the real state was relatively small and therefore more easily harmonised, rivalries and conflicts were of the acutest. Why should that be? The explanation most probably is that each sub-state of a state, each interest, looks on itself as being "the state" and claims that the entire activity of the greater state shall be utilised for its particular objectives. The only remedies for the conflicts which inevitably ensue when there are two or more interests in a state which all claim to be "the state" is either to identify the state with one of these interests (such states are called oligarchies), or else the conflicting interests and sub-states must be reconciled to each other's existence and activity. This is the ostensible object of democracies, but it is rarely achieved except in monarchies or states governed by a dictator. It was the iron hand of a Cromwell which taught each sub-state of England to mind its own business, as each worker in a factory has to mind his own machine.

There is no reason why a state should be built up on the model of a beehive, or anthive, in which definite functions are assigned to the queen, the workers, the

drones and the slaves, nor why a state should be like a living body with its heart and arterial system, its lungs, stomach, bowels, liver, kidney, glands, lymphatic and fat ducts, brain, ganglia and nerve system, its blood and numerous fluids, bones, skin, hair, etc., all working in harmony. Some insight into inter-action of sub-states in general may be obtained from a comparison similar to Æsop's well known fable about certain bodily organs deciding to starve the stomach.

Suppose for instance that something has gone wrong with a human body, that a man suffers from constipation, then his whole attention will be centred on his bowels, which for the time being gain such an important position that they and the individual have a feeling that the bowels are the essence of man. The bowels practically claim to be " the state," and are treated as such. The real state, that is the man, will probably take a blue pill and a black draught and, deriving temporary benefit he will probably repeat this treatment more and more often until the excessive activity of the bowels leads to loss of appetite. A revolution now takes place, the bowels being supplanted by the stomach which member is now treated as if it were " the state." It is encouraged into excessive activity by doses of strychnine and hydrochloric acid. For a time all goes well. The stomach controls the situation, it receives the desired encouragements in the shape of repeated doses after meals, the bowels are in order and everything seems to go well, at least for a time. Soon, however, the individual suffers more and more from twitchings, and palpitation of the heart sets in. Another revolution follows. This time the heart claims to be "the state." It insists on a cessation of strychnine tonics, and demands soothing doses, for instance digitalis. Once more all is well in the newly organised state except that a copious flow of urine sets in. Attention is now concentrated on the kidneys, fearing this might be the beginning of Bright's disease, power is now vested in the kidneys,

which are for the time being "the state," and which demand repeated doses of opium. This causes constipation to recur and the whole process of special treatments will perhaps be repeated.

Sometimes, perhaps often, it happens that, while the body is not really healthy, but only appears so, because one organ has just increased its activity, though others are being slowly crushed, the person may be attacked from outside, say by influenza. The chances then are that a very serious illness sets in, resulting either in death or in a damaging reduction of general health. This is but natural, for the various organs were not acting together at the time of the attack, and could not effectively shake off the poisonous germs. On the other hand it may happen that having tried the above remedies, some friend may suggest golf or a similar occupation, which requires all the organs to act together, at least for a time. The result will almost certainly be improved health, each organ carrying out its proper functions without claiming the position of prime importance.

The above is practically the life history of most states. In Rome the Patricians maintained the upper hand until, after the Marian attempts at democratic government, the supreme power was transferred to the Cæsars, who saw to it that the inter-state struggles were of a subordinate nature. In other states, for instance in England, the desires of sub-states to be considered "the state" have led to very serious conflicts. The aborigines who had once been "the state" were driven into the several highlands. Then for a time the various Saxon kingdoms were "the state." At last the Normans represented "the state" of Great Britain, including Scotland for a time and Ireland. Gradually a differentiation took place in this rather powerful state. The Barons, a relatively small knot of Normans, considered themselves to be "the state," for England had been parcelled out amongst them. The King, representing the whole state, had for a time to take

a back seat. Then a split amongst the Barons led to the Wars of the Roses. The resulting weakness of the nobility and the support given to the King by the Commoners led to his being looked upon as "the state," and actually represented it, for during the time of the Tudors they and the nation were one. A climax was reached when a similar change of power in France led to the declaration by Louis XIV., "L'Etat, c'est moi." This theory was greedily assimilated by the Stuarts, and "Plaire au Roi" was the motto of all his courtiers, for their very existence was centred in the idea that only the King was "the state," and that it was the duty of every one to please the dispenser of favours.

An aristocracy of the nature of the German Dukes and Princes had ceased to exist after Henry VIII, but now the Yeomanry of England, the farming interest, by whom the land was owned, suddenly claimed to be "the state." They enlarged their powers by remodelling Parliament and gradually built up a system of land laws which, although they did not cripple the trading interests of those days, which were, in fact, rapidly improving, certainly pressed heavily on the rural labouring population, which at that time formed the majority of the nation. Things might have continued on these lines, for they are fairly natural ones in all communities, which invariably consist of an enterprising and dominating portion, and another, the natural slaves, who are content to subsist. However, inventors introduced an apple of discord in the shape of labour-saving machinery. The industrial portion of the community rapidly increased in importance, and plundered the landed gentry in more ways than one. It crippled them by drawing the labourers from the country into the towns, and finding itself in a minority, at least for legislative purposes, it revolutionised the English Constitution by insisting that labourers should have legislative powers. At first these were manipulated for their own benefit, and during the latter half of the nineteenth

century the industrials were saying: "We are 'the state,' other interests, notably the agricultural interests may perish, but although our inventions enable one man to do the work of from twenty to a hundred, we shall not be content with this result of our own genius, we want our labourers to live at half the price they would otherwise do. Landowners provide for their worn out labourers, and they should be taxed to provide for ours also; and as that will raise the price of food it ought to be imported free from virgin lands, in addition we want not only the fathers but also the mothers and children to work for us in confined rooms."

It would, however, seem as if the industrials, as representing "the state," had over-reached themselves, and that their reign may be one of the shortest of any British sub-states. It is they who have placed legislative power in the hands of the thriftless, and nothing is more natural than that the latter should decide on all sorts of misnamed socialistic schemes which have for their object fixity of income, with a minimum of labour.

There is no particular superiority in the people of Lancashire, Northumberland and the Clyde; they have grown rich, not because they deserved to get on, but because they were living over coalfields, and because a few gifted engineers invented labour-saving machinery. Manufacturers have never held together in the same way that the feudal lords, the yeomanry, or the merchants of the Hansa towns have held together and have formed definite sub-states. They have been extremely individualistic, but have had no grasp of the general situation and do not seem to have been endowed with the power to combine. That is now being done over their heads by shrewd financiers. Cobden and Bright, two Lancashire industrials, aided by the even more brilliant Gladstone, with the help of Adam Smith's dogma about wealth being a nation's highest aim, forced England to accept the industrial class as "the state." This teaching

has been taken to heart by those who are forced to work for a bare living: the thriftless, who, unless they drift into submitting to a dictator, under the guise of a Secretary of a National Union, are likely to play ducks and drakes with the civilisation, about which they profess that it has done them no good, but only harm. They will do what the illiterate Marius and his party did in civilised Rome and will destroy the state ideals and pave the way for a Cæsar. Already they have obtained what the nobility caste of Germany was alone able to retain through centuries of onslaught by their Emperors. They claim to be a law unto themselves and not to be amenable to the common law of the land. Trades Unions cannot now be punished for illegal acts of their officials, any more than little over 50 years ago in Germany, and 150 years ago in France and 300 years ago in England a nobleman could be punished by the community even for the most flagrant offence of his servant. Thus, during the last few years, England through its Trades Unions has already stepped back 300 years.

The savage Germans looked on the gold and silver of the Romans as something to be hoarded. They did not know that it was merely a trade lubricant, an economic flywheel, and by treating it as booty they drove it out of Europe. Similarly the thriftless look on capital as something real, something as substantial as the earth which they tread, something to be plundered, quite overlooking the fact that capital and property in general are, one might say, modern inventions, enormously encouraged by the Limited Liability Acts of about 60 years ago, but quite impossible of existence in any community in which any one state, be it King, legislature, nobility, unions, etc., are above the laws which have been evolved for the security of property. This was taught in the temple of Juno Moneta. Abrogate laws of property, confiscate it or attempt to do so, and it vanishes into thin air. This has been proved over and over again; even the impoverish-

ment of Ireland can be traced to this cause. Now that the nation is saddling itself with a national pension scheme, the thriftless will thrive until the thrifty have no more to give, and then a condition of things will be revived like that which was brought about in Rome, where a once noble race claimed that it must be fed and amused at the expense of the conquered empire. An indication of the possibilities in this respect has recently been afforded by the Poplar district of London, where the rates, which were practically levied for the benefit of the thriftless portion of the population, grew to be excessive. They had to be paid by the thrifty, by the local industrial undertakings, until those which could remove and transfer their activity to other districts and to other countries naturally did so. When plebiscites gain the upper hand, as they did in the French Revolution, no one can tell to what excesses they will go, and it generally requires a dictator like Napoleon or Cromwell to put a stop to their doings. He will represent, as it were, the medical blue pill, and then in turn the various organs of the state will want their medicines, unless, as may easily happen, all the constituent and complaining states have in the meantime been wiped out by a foreign enemy.

Leaving the possibilities as to what the working classes will do with the state, when they imagine that they are "the state," a glance may be thrown at another disruptive influence, the activity of political parties, for each one looks on itself as being "the state," though not quite to the same extent as in America, where apparently every citizen seems to be actuated by a desire not to further the welfare of the community, but of "the state," which he interprets as being his party. In England, the two great parties have alternately represented the nation's changing interests. The Whigs at one time represented the aristocracy, but gradually gave way to the Tories, who, broadly speaking, once represented the Yeomanry class, and therefore the small land owners. The Whigs then

joined themselves to the newly risen industrials and formed an enlightened oligarchy, but it could not prevent their allies from crushing the farming interests, and it entirely collapsed when Gladstone's disintegrating theories found favour. New parties were now formed, the Unionists championing the Old Englander idea of state union and the Puritan or urban views about inviolability of contracts, whereas the others, variously known as Little Englanders, Radicals and Socialists favoured state disintegration, state interference with contracts and state support for the thriftless. The power of this party naturally lies in Radicalism, which, as the name implies, would tear up things by the roots. Unfortunately most people see only the particular root over which they have stumbled, and forget that when all the roots are destroyed the whole tree, " the state," of which after all they form but a part, must fall.

Few if any countries have had the same chance as England—one might call it the privilege—of having passed through such a complicated cycle of national illnesses and political nostrums. That it has survived can hardly be due to any national superiority, but only to a safe insular position, and like a rich patient, England can afford to allow herself to be treated by quacks. That is why we can indulge in party politics, and fortunately no external forces have yet shaken the Constitution to its foundations. The One Hundred Years' war with France merely drained away the British nobility and serfs, the Spanish Armada seems to have had a national unifying effect like sudden dangers or hardships in personal constitutions, and the Napoleonic wars, during which no part of England ever got into the hands of the foreigners, found us so secure, that they tended rather to breed discontent than a spirit of unity.

How different have been the conditions on the Continent. The ravages of the Huns created the union which resulted in Charlemagne's Empire. The conquests of the

Moors in Spain united that peninsular into one kingdom. The fearful Thirty Years' war, in which the population of Germany was reduced to twenty-five per cent., created a desire for unity, which was unsuccessful. The attacks of Charles XII. of Sweden on Russia led to a unification of that Empire, and the fearful ravages to which Germany was again subjected during the Napoleonic wars, combined with the treachery of the nobility or Prussian Junkers, created a desire for national unity, which Bismarck turned to lasting account.

All this is well known, and England must count herself fortunate that there has never been an occasion for head, heart, liver, kidneys, and all the organs of the body politic to work together at fever heat. The everlasting legislative medicines with which every nationality of the empire, every interest has been separately dosed, must by now have made each member of the British State as rotten as the organs of a man who has tried every patent medicine. It is fortunate, but quite accidental, that the anti-unionist tendencies—not used in the party sense—of England have never revealed that her people are not a state in the sense that Rome was a state. Is it imaginable that England could have survived similar vicissitudes to the incursions of Hannibal, the Gauls, Kimbers, Teutons, and subsequently the Goths, Vandals, Lombards and other Germans? Things were different in Rome from what they are here, the constitution of the state was based on the idea of unity, whereas here the leading principle is individualism, tending to disruption. This is carried so far that ennoblement, the highest reward, which on occasions is conferred on generals and other statesmen who have done service to the state as a whole, is generally given to men who have encouraged civil war. The head of the state seems to be compelled to have to occupy the unwelcome position of having graciously to smile first on one set of men who have poured their hundreds of thousands into the secret war chests of one party club, and then to smile

on another set of men who have given as much to the club of another party, which was thereby enabled to beat the first one. Would it not be better for the country if, as had to be done near the close of the French Revolution, political clubs should not be allowed to exist? These clubs are not even organs of the state, they are not sub-states, but growths like corns which cause the sufferer to lean in turn first on one foot and then on the other. No one takes note of these dangers, and the encouragement which teetotal laws are now giving to the formation of drinking clubs may not unreasonably lead to a condition like that of the French Revolution.

It has been held to be wrong, perhaps immoral or criminal, for titles to be sold, as was done by the Georges, and is still done by foreign rulers or by "the state," and for the benefit of "the state," but it is only rarely that a protest is raised against men being raised to the peerage, who with their money have encouraged political civil war. Instead of assisting persuasive but impecunious barristers to pay their election expenses, such moneys would have done infinitely more good to the state by supporting promising young citizens, by donations to educational establishments, or to research laboratories. But men who might love to serve the state as philanthropists, unless they counterbalance the one good they do by assisting some political party in fighting its rival, are not likely to receive coveted titles as rewards. The Prime Minister of the day will tell them smilingly that charity should be its own reward, and as head of his party, he may also hint that, as charity covers a multitude of sins, so will the benefactor's past actions cover his possible future encouragements of political strife, which would be duly rewarded with a title.

These secret political practices, like secret human vices, if carried to excess, had best be entirely eradicated, and this could be done by compelling political clubs, leagues,

societies, etc., to publish the sources of their incomes. We are governed by clubs and we should know who control them. Already half the nation believes that it will be good for the average Briton if one or the other club should manage to secure lasting supremacy by raking in donations of say £5,000 to £10,000 apiece from five hundred expectant recipients of peerages. The nation also seems to see nothing incongruous in our political clubs being in the pay of foreigners. Surely this is illegal, because it is against public policy for foreigners to pay election expenses; then as Americans have subsidised the Irish party every time a Nationalist votes he makes himself liable to a fine of £500 which anybody can recover. In the Irish case the money transaction was a fairly open one, but who can guess how much secret money is being paid by foreign trusts for and against tariff reform, by foreign religious orders for or against reforms in education, and by foreign governments in support of Home Rule, political strikes and similar anti-state ideas. In the past the German Hansa League interfered with the fiscal policy of Edward III, Catholic France supported Protestantism in Germany, and similar things will happen again.

The desire for sub-states to predominate has been similar in other countries. The various tribes of large states, or the various families of smaller ones have from time immemorial looked on themselves as being "the state." The Franks on either side of the Rhine were once "the state" of Northern Europe. The Manchus still look on themselves as "the state" in China, and European communities in Africa, America and Australia look on themselves as being "the state" in those continents. The aborigines have no say. India, however, is a notable exception; there the administration, misunderstood as it is in Europe, is for the benefit, not of the English community in India, for it is ever changing, but for the benefit of trade, which, because it can flourish only where

there is security, has proved itself to be a blessing in disguise.

A pause may here be made to inquire into the effect of the predominance of one tribe over others. In some cases, such as that of England's rule in India, and of the Roman community over the Mediterranean peoples, the effect has unquestionably been a good one, or rather, such combinations have been states of which it can be said that they were more real states, more perfect and more lasting states than many others. If these are compared with those in which savage communities ruled over civilised ones, as, for instance, the nomadic Hyskos over the civilised Egyptians, the bloodthirsty Assyrian over the cultivated Babylonians, the fanatic Mohammedans over the philosophic Hindoos, the savage Germans over the civilised Romans, it is felt that states of the former class are infinitely more perfect and therefore, as states, more happy than the latter. This seems obvious, for in the former states, civilised communities having the necessary physical power and the administrative ability have ruled over and guided less advanced peoples. In the latter case, the savages, though victorious, felt the superiority of the vanquished, and, out of jealousy and by brute force, have crushed and re-crushed civilisation wherever it dared to rear its head.

The above sketched condition has often been brought about by some military invention or training, by which one tribe has been enabled to predominate over others who, in some respects, were its equals or superiors. The history of the Middle Ages is full of the resulting reactions. First one and then another German or Scandinavian tribe, by sheer brute force or military trick and not because of any superior civilisation, gained temporary superiority over others, and during these short periods looked on the larger state as being there merely for its own particular advantage. This condition was a disgrace to the whole lot of North European tribes, for there was

an entire absence of real states, and of civilisation in general. Modern history has proved that these ancient savages had in them the making of real states, but the interminable civil war, as interminable as our own political strifes, was evidently the reason why this display of superabundant energy achieved no lasting effect. The feudal system, the only too perfect invention of Charlemagne, helped to prevent progress, and it finally seemed to be the cause of all evil, for not until it was seriously attacked, first in England, then in France, and lately in Germany, was there any real advance in culture.

To recount the strivings of the various leading families, would be to repeat the history of Europe as it used to be written. The process was always the same, either by conquest or marriage, of which the most typical cases are respectively the Hohenzollern and the Hapsburg families; a succession of enterprising knights attained the rank, first as Earls, then of Princes, Dukes, Kings and Cæsars, or Kaisers, and occasionally, as was once the case with Prussia, the ruler having wrenched his kingdom out of the hands of what he considered savages, as America has been wrenched from the Red Indians, proclaimed that those who did not like his dominions could go elsewhere. "L'Etat, c'est moi." This was the same principle as that of the early American colonists, and if Quakers were burnt in Maine, it was because they were not wanted in a state of methodism. The same principle swayed Philip of Spain, who would rather reign over a deserted country than over a thriving but infidel people.

As long as Prussia was a kingdom built up by one family and saved from ruin and rebuilt by a genius like Frederick the Great, so long the state and the ruling family would, in a sense, have identical objects. A state which is the glorious creation of a family is not likely to be wantonly ruined by it, but where a family attains the supreme position, either by marriage, conquest, or by the choice of a people, as in Germany, when Lettish Prussia

was joined to the Germanic States, or merely by marriage, as when the Stuarts came to England, the reverse may easily happen. The theory that the King's family is "the state," that all the resources of the greater state shall be utilised only for the pleasure of the King, as with Charles and all the Stuarts, or for his, the King's glory, as with Alexander the Great and all his imitators, is one which seems bound to raise civil war, either political or sanguinary, on the part of other sub-states who consider themselves to be as much "the state" as is the King's family, if not more so.

These remarks are not intended to cast any reflection on the various past and present conditions, but merely to indicate how it is that certain arrangements sometimes work harmoniously and result in more or less perfect states, and at other times lead to discord and strife, and to the disappearance of any harmonious working.

Are unification and harmony in accordance with the striving of energy, whatever that may be? The answer is no uncertain one, even though it may be based on an "if." If a state, like an individual, is a manifestation of energy, then like an individual its members would have to work in harmony in order to be a state, just as the melodies of a piece of music, though full of strife, must be in harmony. That at any rate is a strongly expressed popular feeling, for only those few men who have succeeded in building up empires, *i,e.*, uniting and harmonising vast multitudes, have been called great. Alexander, Cæsar, Constantine, Charlemagne, Peter, Catharine, Bismarck, are conspicuous examples, whereas Hannibal, Attila and Charles XII. are merely marvels. This distinction is extended even to preservers of unity, to the wisest of legislators. Thus Gladstone, the apostle of the doctrine that every nationality, every tribe, should weave its own destiny, is almost forgotten, whereas Bismarck, his contemporary, the uniter of Germany, will remain great, even in the eyes of his enemies. The sub-division

of Scandinavia into two kingdoms had so far disgraced King Oscar that he retained little sympathy even in Sweden, whereas the marvellous genius of the Hapsburg family, notably of the Emperor Francis Joseph, in holding together thirteen distinct nationalities, of which eleven have a no more comprehensive title than "the Kingdom and States assembled in the Reichsrath," has gained for that family the admiration of the world.

The desire to create united and harmonious states has been strong in many rulers, so much so that some, like Philip II, have not shrunk even from employing the stake for the purpose of bringing their people to a uniform system of believing, and had he succeeded, the world might have called him great. But there is another class of rulers thirsting for the vulgar applause of the multitude, or perhaps for the more lasting praise of the historians, who have misunderstood the essentials of greatness, and have tried to earn that appellation by forcibly—preferably by brilliant conquests—tying together heterogeneous elements without giving any thought to harmonising them. Their ideal has been that of the "World Empire" in whose arms Alexander expired. Yet he was truly great, if for no other reason than that by founding Alexandria, away from his original kingdom, he gave cosmopolitan stamp to his new empire, of which the harmonising principle survived even when the state fell to pieces after his death.

World Emperors aim at dominating the world; to them harmony is a means to an end, not an objective. They look on themselves as being "the state," and have nearly always claimed divine descent, or at least divine inheritance from a creator. Alexander even bargained with the god Amon, promising to proclaim him as his real father, and Cæsar strutted about as a descendant of the goddess Venus. Then too many dynasties have adopted the appellation "Children of the Sun," etc.

Typical World Empires generally have rapidly fallen to

pieces on the death of their builders. They rarely survived their purpose of glorifying their tinkers. Attila or Etzel could boast of a World Empire extending from the Pacific to the Atlantic, but it disappeared with him. Charles XII poured out the blood and prosperity of his nation in the hope that history would place him above Alexander, who, in Charles' eyes, was tainted with royal weaknesses of loving wine and women as much as glory, and of keeping what he took, whereas Charles XII. made presents of his conquests. He was a rare type of spendthrift; it was not money but power which he squandered, a power which might have done infinite good.

Very similar remarks apply to nations, as distinct from individuals. Why are the ancient Greeks, the Romans, and the English looked upon as great nations? Because their teachings, their conquests, their trading practices have had the effect of harmonising numbers of peoples. The Franks, who, from Charlemagne to Napoleon at any rate, aimed at uniting the Germanic tribes, have for 1,000 years been looked upon as a great people, whereas their brethren, the Germans, with their quarrelling tendencies, and their love of servitude and of fighting even as mercenaries in any cause, and on both sides of a cause, have not yet earned for them the coveted appellation, and time will show whether they are going to be harmonisers or quarrelsome and intriguing disturbers of harmony. It would certainly be surprising if a state, with a backbone of Lettish Junkers who, during the Napoleonic incursion, showed how poor a lot they were, should ever be able to rival the Roman Patrician.

One day, perhaps, the engineering profession, whose cradle was England, may also be called great, for engineers, with their ships, railways and telegraphs, have done their best to provide the means for harmonising the world. In comparison the legal profession will perhaps be dubbed little, because of its hair-splitting tendencies, especially when they permeate into the political world.

Leaving the World Empire idea and returning to the question of state harmonies, a battleship may be taken as a model. During times of inactivity there may be rivalry, and to a certain extent, animosity between the navigating staff, the artillerists, the engineers, the sailors, the stokers, etc., but during action and in face of the enemy, each branch does its duty, and all assist each other under the guiding influence of the commander's staff. Before the event there may be heart-burnings as to which department is the more important, whether a battleship is a mechanical device, and whether everything depends on the power of the engines and the speed of the ship, or whether the navigating staff, who direct the course and keep clear of shoals and mines, represent the ship, or whether the fighting department which, with more or less certainty directs the gun and torpedoes at the enemy's vulnerable points, is the essence of the man-of-war. No sooner, however, does the enemy heave in sight than the engineer thinks only of giving the desired speed at the right moment, the steersman with his eyes fixed on the compass listens only for instructions as to the changes of the course steered, and the gun layer pays attention only to the dials which tell him in what direction he has to train the guns and for what range he has to set them. It is the essence of discipline to prepare for action, to train the various departments so as to act in each other's support, and a true commander is he who, ignoring whatever pride he may feel in the eminence of the department from which he was drawn, does not lord it over others as a superior, but guides them to see the necessity of helping each other, even in times of peace.

This functionary is sadly wanting in the ship of state. The ruling caste, let it be a royal family, an oligarchy, an aristocracy, or a political party, is rarely the guiding hand of a nation, but looking on itself as being "the state," merely lords it over other equally important sub-states, and what is worse is, that the tendency of the leading

sub-state is often not the national tendency, and grows unbearable if persisted in for long; or, and this is equally bad, it is perpetually changing. This is the trouble with elective monarchies and republics. The United States of America must not be taken as an example, for they are not yet involved in international complications, nor have other large republics had a sufficiently long life to afford illustrations, but the old German Empire, with its elective Emperors and the Polish Kingdom, with its elective Kings, are warning examples on a grand scale. The natural choice of "the state," in these cases, of course, the nobility, which has felt the iron hand of a strong individuality, would naturally elect a mild successor, and those who had had a generation's experience of national disasters under a vacillating monarch would readily agree to serve a resolute master. England had one experience of the kind when Stephen was elected, and except during the Wars of the Roses, adhered, in practice at least, to the principle of heredity, which offers the prospect of such continuity as may be hoped for from the maintenance of traditions in one family. Yet even English experiences with regard to change of families, as for instance from the very English Tudors to the very Scotch Stuarts, and then to the very German Georges, have, to say the least, been strongly varied.

Even the succeeding individuals of one reigning family have often been entire reversals, if not in character at least in tendency, as Frederick the Great could have testified, when, merely due to the death of Elizabeth Petrovna, the whole power of Russia, which up to that day had been acting against him, suddenly came to his support, and then in a few years' time, due to Paul's death, was as suddenly withdrawn. Then too, Frederick the Great, who would probably have been a match for Napoleon, was followed by a nephew and his son, whose names Prussia would gladly erase from her history. England too, with her longer history, has experienced

similar drastic changes, Edward I, who united England and Scotland, being followed by the weak man who fled from Bannockburn, and he by the energetic Edward III, and his son the Black Prince, and they by Richard II. After Henry IV. came the glorious reign of Henry V. and the weak one of Henry VI, and in more recent times the accession of George III. meant that the capable advices of Pitt were discarded for those of Bute, which led to Frederick the Great being left in the lurch, and to the American colonies revolting. This they could never have done successfully if France had been hampered by Prussia.

This vacillation is almost absent from Italian oligarchies, where the Roman Patricians, the Papal State, Venice, Genoa and others are lasting examples of steady policies. What was the secret of the success of these states? Possibly, but not certainly, it may have been due to a superiority, either intellectually or administratively, of the ruling or guiding caste in each state. The success was certainly due in part to the continuity of the state tendency which seems impossible with Kings, Presidents, and other Constitutional systems, it was unquestionably also due to the capacity of these Italian oligarchies to adapt themselves to the changing conditions of the world, processes which were facilitated by a dislike for fixed constitutions. The German, French and English aristocracy and the Hansa towns had not this gift; on the contrary, as soon as they were created they rapidly fossilised all their most unnational characteristics. Possibly a difference of national character may have been the reason why oligarchies have not succeeded north of the Alps, where on the whole the best results have been obtained under the influence of royal families, more especially if England be taken as the leading state, for here the tendency towards petrifaction of state ideas has always been counteracted by a very outspoken popular voice.

The judicious modification of state tendencies is, no doubt, one cause of the longevity of the Papal state, in which past traditions, forming the backbone of the state, have repeatedly been added to or changed in accordance with the changing conditions, in which the faithful found themselves. It is not many years ago that the Papal infallibility was for the first time definitely proclaimed, and the pronouncement of the dogma of immaculate conception of the Virgin Mary, although demanded during several past centuries, was only made in 1854, and it is only now, eleven hundred and forty-five years after the declaration of the indissolubility of the marriage contract, that the Pope has decided that none but Church marriages shall be recognised.

The various churches, to the best of their ability, have often acted as national guides, and as such they have generally been the repository of national traditions; sometimes they were the indicators of changes, sometimes their imitators; in other words, they have been the friends, philosophers, and notably the guides of the people. Before a church can guide it has to be in harmony with its flock, which, no doubt, accounts for the very marked inclinations which different races and different tribes have for different types of religions. But when any religion has once been adopted its influence is generally so great that different communities remark sarcastically about each other that they are priest-ridden. The adoption of a religion merely means that when a community has definitely chosen a set of men with definite views to guide them, it tends to rely on these men for guidance. It does not, however, follow that this guidance tends towards the perfection of the state; more often than not a religious system, having been selected because it was in harmony with the average tendency, either good or bad, has accentuated it. Where this occurs one may say that a state immorality is being committed.

The influence of religion on large states composed

of several different tribes, such as England, has been to intensify the differentiation between the naturally Catholic Irish, the naturally Calvinistic Scotch, the naturally Methodist North English and Welsh, and the naturally Church of England South Englishmen. Unquestionably the disintegration of these sub-states is greater since the Reformation than during the days of supremacy of one Roman Catholic Church, in spite, too, of the infinitely greater facilities for union which have since then been provided by the engineering profession.

This brief reference to monarchies, oligarchies and plebiscites suggests that a state should consist either solely of a superior race of individuals, tended perhaps by slaves, as was the case in Greek townlets, or else the state should, as a whole, especially if it be a large one, possess itself of a guiding, but not necessarily a ruling, caste, into which the best individuals of the nation would constantly be drawn and from which the wasters would be ejected. Such a caste might be relied upon to hand down national traditions and perhaps also to indicate when constitutional changes were desirable.

In the face of modern individualism, and in the face of centuries of strivings of sub-states to dominate other sub-states and thus elevate themselves into the position of "the state," it is of course useless to suggest that any nation would voluntarily saddle itself with a guiding caste, or allow such a one to come into official existence, but, just because of this impossibility the imaginary precautions which would have to be adopted during the building up of such a caste may here be sketched. This has the advantage, in a socialistic age, of showing how difficult and slow it is to create even a small state within a large one, and how infinitely more difficult and more tedious it would be to convert any state, however incongruous, into an ideally perfect one. Even the formation of a single caste, whose members should combine all perfections, seems somewhat impossible or rather nature

is incapable of combining all extreme excellences in one body; certainly the highly imaginative Greeks had to invent separate gods in which to house extreme but excellent human characteristics, for these would otherwise have neutralised each other. Diana, the Furies, Minerva, Bacchus, could not possibly be combined to form a single god or goddess. It is perhaps not without significance that jealousy is the only tangible human characteristic with which the superlatively perfect Jehovah of the Jews was formerly clothed, for this characteristic has no counterpart like love in relation to hate, truthfulness in relation to lying, wisdom in relation to ignorance.

Combines, societies, or other sub-states are being constantly formed with the very definite and, from the point of view of the larger state, the very criminal objective of constituting themselves "the state." In older days there was the aristocracy, now there is also the plutocracy, the "trades unions" and innumerable societies which would exclude from their respective sub-states all who do not comply with their conditions, all who are either not refined, not rich, not teetotalers, not anti-vivisectionists, etc. Formerly such societies, at least those which have survived, had in view some state improving object. Freemasons, for instance, have charity for their objective, the various orders of the Roman Church had its welfare at heart, and the Society of Jesus, perhaps merely as a means to an end, devoted itself to improving the state or part of it by education.

Could it not be possible to form a sub-state similar to that of the Jesuits in relation to Christianity, which should be a guide to the nation, not only by its members leading perfect lives, but also by their engaging in education, and encouraging the production of perfect, or at least worthy citizens, rather than the giving of charitable donations, which can be done only by the rich, and might, in a perfect state, be left to the state.

Could not such a sub-state guide one or several nations to become true and perfect and lasting states? At the

first blush most people would say that with a little effort such a society could easily be formed, and in the opinion of many it has already been formed. A Radical or Unionist points to either party as being this ideal sub-state. Then there are the various churches which have always guided the nations in what they think the right path. Then there are the societies of teachers, the great Universities, who have no doubt but that if the care of the nation were placed in their hands all would go well, but one shudders to think how thoroughly classical they would make the nation, how like China. Then lastly, but not least, there are the Trades Unions, which are steadily drifting into communistic dogmatic ideals of one dead low water level of equality for everybody, a political Nirvana, a state in which there will be life, but no rivalry, obedience but no thinking, labour but no saving. Thus in the eyes of the votaries of each sub-state, it alone is the basis for an ideal state; and the only state of which they can grasp the meaning is their own particular one, which is to be all in all, and not only the guide but the ruler of the rest of mankind.

The suggestion that there is room, in the larger state for a guiding and not necessarily a ruling or administrating sub-state, implies that its members should be as perfect specimens as can be found, and that again means that not only the laws of heredity, about which little is as yet known, should be carefully and constantly inquired into, but also that the equally difficult questions as to what constitutes perfection in man, and what is the best education for the individual and for the nation should receive the same painstaking attention. That mankind has always believed in the possibility of improving the human race is evident from some modern and ancient attempts in that direction. Frederick the Great's father mated his Grenadier Guards with the largest women, so as to breed a race of large men, the Spartans killed off all children who were not likely to develop into gladiators,

and several royal and priestly castes limited their members to marrying their nearest relatives, this being done in the belief that only they were of divine origin. Change but no improvement seems to have been effected by these attempts, and successful results are not likely to be attained unless, at first at least, some of Darwin's teachings are taken to heart. Attention will certainly have to be centred on such difficult subjects as natural and artificial selection, and on methods by which the unfit can be rejected.

Those people who idolise reason and who insist that even our instinctive functions ought to be rigorously directed by it, have invented a host of marriage artificialities and restrictions, including matrimonial alliances between equals, marriage brokers and odd regulations about intermarriage with distant tribes, etc. Other people who have had ideals about race improving possibilities have hoped to effect their purposes by crude methods of artificial selection, the most notable recent cases being Frederick the Great's attempt to rear a race of giants and Napoleon's suggestion while living on St. Helena, that each Frenchman should be married to two wives, one white and one black. He was evidently carried away by the striking superiority of most first crossings over their thoroughbred parents, and did not know that the descendants of crossings of heterogeneous parents are typical mongrels, with no stability of type and full of reversions. A recent illustration of this experience is the crossing of the English and German wheat. The first crossings were superb specimens, but now after thirty years or generations of close breeding and rigorous weeding out of all departures from the ideal first crossings, the desired stability has not yet been attained and reversions to the English and German types are frequent. The same experiments on human beings seem to have been carried out with regard to the Jews and the Moors, and now after the lapse of respectively sixty generations since the Babylonian

captivity, and forty generations since the conquest of North Africa, non-typical children are constantly making their appearance in both races. Information about the origin of the Jews is not very definite, but that the Moors are the result of crossings of very heterogeneous elements will be evident when it is remembered that when the Arabs overran North Africa it was peopled with the ancient Egyptians, Jews, Greeks, Romans, the whole Vandal tribe and by a lot of half caste and negro slaves, and that since those days the Moors have freely intermarried with female slaves captured from perhaps every nationality in Europe.

Practically all social systems of the world concern themselves, often unconsciously, with this question, and practices extend on the one hand from the purely artificial selection of most oriental peoples, to primitive natural selection among some savages and to a somewhat artificial and yet natural selection amongst most Germanic communities. The strictly artificial selection of most orientals is centred in the broker; he or friends or relatives of marriageable individuals or sometimes children, mating those who, in their eyes, are best suited to each other. Judged by historical records, this system seems to be a failure, having produced no race or tribe with an average strength of character at all resembling that of the Greeks, Romans and several Germanic tribes, not forgetting the Anglo-Saxon. The artificial system does, however, seem to produce pure strains, such in which one or more characteristics are strongly developed in all the members, as for instance, the money making capabilities of the Jews. On the other hand, the system does not seem to be of a flexible and adaptable nature; at any rate, in spite of living for centuries amongst other races, the Jewish character has failed to be evolved in such a way as to harmonise itself with its surroundings, either in the Orient or the Occident.

The selective systems of the European peoples are of the

natural type, and have produced striking results. As a rule husbands and wives not only prefer to make their own selections, but frequently object to all outside interference, and in past ages at least, as for instance the Germanic tribes with their hand-fasting marriages, the tendency was to attain the most intimate acquaintance before settling down into the permanently married condition. Amongst the Greeks selection was also practically left to the instinct. There can be no doubt but that, in spite of the flowing robes on their statues and vases, they did not trouble themselves overmuch about dressing, and would feel no more awkwardness in public if undressed than a man to-day would feel if he discovered he was minus a button or a necktie.

There is certainly nothing suggestive or tempting in mere nudity. The Tuscan version of one of the Paradise legends is that the feeling of shame came to Adam and Eve after and not before they had made themselves garments. This seems to be in harmony with North European feeling and amongst savages who indulge in bathings, whereas the account in Genesis seems to echo the feelings of Arabs, whose women clothe even their hair. The Germanic tendency is in the other direction, and our women at least feel even more pride in the beauty of their forms and the perfections of their skins than in the attractiveness of their dresses. Nowadays, however, by carefully preserving the young from seeing any but their own nakedness, people seem to believe that a very violent amorous effect must be produced by such trifles as merely exposing a few inches of female ankle or the biceps of an athlete. This blindfolding of the senses which should guide the instincts, accounts, perhaps, for occasionally young lordlings being captured by scantily dressed ballet girls, for surely the ratio of perfect to imperfect figures must be infinitely greater amongst the upper classes, with all their helps, like good living, bathing, etc., than amongst the slovenly underfed and vulgar poor, and if graceful

dancing were ever to become the fashion, there would be far less difficulty in finding perfect figures amongst the well-to-do than is experienced by stage managers with the class from which they have to make selections for their ballets.

Some people would remove the nude from art, but the only valid excuse for doing this would be that artists do not always draw true to nature, and that their misrepresentations and wrongful accentuations mislead the feelings of the immature, who are disappointed if the reality is not as grotesque as fiction. They are led to expect the serene brow of Minerva in combination with the voluptuous body of Venus. This remark applies with ten times greater force to thousands of popular novels, which give to the inexperienced a most warped impression of character and of life, for nearly every author combines traits of characters in his heroes which are as incompatible, though not as glaring, as the Jekyll-Hyde combination.

Even Shakespeare although marvellously true to nature, was occasionally careless in the labelling of some of his characters. Thus Shylock is a type of Jew who has to be looked for in vain in the records of the Old Testament and amongst the living, and Othello is neither a typical Moor nor a typical Italian; at least Byron, who ought to know, laughs at the idea of his jealousy being of a southern type. The Moors are the result of crossings between ancient North Africans, Vandals, Arabs and Ethiopian slaves, and as such it is but reasonable to suppose that Othello would have prized above all other goods a wife who was the child of the Lombard race, the last to give up its exclusiveness as regards inter-marriage. To be deprived of this treasure, to be thrown out of a caste into which he had entered by marriage, might perhaps lead him to kill the author of these misfortunes, but a Moor in his position would never dream of destroying the keystone of his social edifice. The murder of his wife might suggest itself to a man who was her social equal,

and had adopted unnatural views about marriage, but it would never enter into the mind of a crafty and energetic Oriental. Those, therefore, who turn to Shakespeare for information about typical Jews, Moors, English kings, etc., may be misled, but they are not likely to go wrong if they enquire of him how a certain character, no matter what it may be labelled, would act under certain conditions. Shakespeare has no Jekyll-Hyde characters which are so frequent in modern plays, novels and pictures, and which give such warped notions to the young, who in the nursery, school and society have been fenced off from natural objects and experiences, and have been scolded and drilled into believing that their own natures are wicked, whatever that may be, and that nothing is good or at least correct but conventionalities and artificialities.

It has already been suggested that those parts of the body which now are permanently clothed would, if viewed as a whole, convey a far more perfect impression of the character and intellect of an individual than the face and hands, and if that should be so it would explain why the Athenians, with the goddess of Wisdom as their ideal and with full opportunities at their sports of being impressed with the complete persons of their future husbands or wives, should have developed the intellectual powers of the race as rapidly as they did. It must be remembered in connection with this matter that by carefully training the speech it can be made very effective in hiding one's thoughts, so also the face, by being constantly exposed, unquestionably attains a power of effectually hiding one's true inwardness. With other parts of the body that is less easy, but savages readily submit to tattooing for this purpose, and ornamentation had primarily no other object in view. This wish to mislead probably grows out of an unconscious feeling of the importance of correlation. For instance, a comparison of the Ethiopian and the white races suggests that weak legs and weak brains are likely to be found together,

and strong thighs and good working brains. Then also the ferocious face and slowness of movement of a bulldog are accompanied by the best of tempers and a fair intelligence, while the quick eyes and bodily agility of the greyhound are associated with a poor brain, the absence of smell and of the average dog's most frequently praised quality: faithfulness. It is a common experience or rather belief that the hearing of the blind man is improved, and it seems but natural that the eagle, with his sharp eye, should have little power of smelling, that the spaniel with his good nose should have relatively poor eyes, and if, as oculists say, the average Anglo-Saxon has exceptionally good eyes, he, like the eagle, should be content to suffer the disadvantage of having little sense of smell or taste, and of not detecting that his cooks are equally deficient.

By sterilising the crossings of unrelated and of distantly related races it would seem as if nature had set its face against crossings and had inspired contempt and animosity for each other amongst nearly related thoroughbred races. Even Mendel's experiences seem to indicate that crossings of nearly related but slightly differing organisms do not naturally result in a blend, but that the majority of successive offsprings revert to the pure types of the parents. This race separating tendency, the initial effort perhaps of a species creating power, has in many European tribes been crushed by the brotherly love doctrine, which was so eagerly taken up by despised races as a protest against Roman airs of superiority. It never attained its nominal object, and its modern interpretation might therefore readily be dropped if it should be found that intermixture of non-related races is not good for humanity. But such a point cannot be discussed with profit until most elaborate researches have been carried out, the problem being complicated by the experience that the first crossings of distinct races are sometimes superior to their parents.

The most thoroughbred amongst the smaller exclusive communities are the upper castes of India and China. They are doubtless the pure descendants of the leading families of prehistoric conquering tribes, and therefore not the descendants of crossings of heterogeneous elements. The Roman Patricians, too, had all the attributes of a thoroughbred race, successive generations of single families, like the Scipios being very similar in abilities and character. They were either pure Italians or a cross between Italians and the nearly related Greeks. No sooner was this relatively pure strain allowed to intermarry with non-Romans, than a rapid degeneration set in. However even these examples, seeing how few they are, cannot be looked upon as affording any reliable information on a subject about which little can be known until experiments extending over many generations have been carried out, for it is obviously not permissible to draw conclusions from the crossing of plants, and from the breeding of cattle and to apply these to human beings. It may even be possible that the experience gained with one tribe of people is not applicable to another tribe. Thus, for instance, it appears that Europeans seem unable to stand the effects of close intermarriages which are bound to occur in lonely highland villages, whereas some Orientals, notably the Japanese Dynasty, seem to recuperate under such a system of exclusiveness, and other Orientals, in order to keep pure their race, which they professed was descended from the gods, actually encouraged intermarriages between cousins, brothers, sisters, mothers, and fathers, and yet seemed to have come to no more serious harm than that which overtakes all those ruling families which cut themselves adrift from every intercourse with their subjects.

Unfortunately many of these questions, whose importance has undoubtedly been felt in all ages, cannot be studied in the human species except by the tedious process of summarising the experiences of generations. This

may have been done by some religious systems but humanity will long remain in doubt whether any of their numerous regulations about marriage are the results of centuries of experiences or merely the invention of reformers, quite ignorant of the subject.

There is, however, one point preached by Darwin, about which little doubt will be felt, and that is that Evolution has perfected organic life by letting only those survive who were fittest under the varying surrounding conditions; and artificial improvements of plants and animals have been effected, in part at least, by a merciless shedding process: a breeder carefully destroys all those individuals which do not conform to the type which he is trying to perfect. This principle has not been applied to any of the exclusive castes, and without it human perfection, whatever that may be, seems impossible of attainment. But it is nowadays impossible to exterminate imperfect members of large communities, and even if this were possible it would be unwise to do so until human perfection has been defined, and until it has been shown that all the qualities which constitute perfection can be combined in single individuals.

It would, however, be possible to repeat, what has often been attempted, the evolution of one or more superior castes, which if they are truly superior, will not seek to establish themselves as "the state," but will be available as friends, philosophers, and guides to the greater state. This seems to have been the function of the Levites and other priestly castes, of the Prophets and of the Greek philosophers, and nowadays of the newspaper editors, but the results do not seem to have been as satisfactory as the more drastic state control of the Roman Patricians or of the upper castes of India. If, therefore, any attempts should one day be made to improve humanity, they would have to be confined to small circles, whose unworthy members could easily be shed by letting them re-unite with the general public.

It is well known that the nobility is selected and advanced by kings and the priesthood is advanced by high priests, both practices being based on the assumption that certain single individuals are from birth possessed of a power, or have acquired it when being anointed, of knowing what is human perfection and of detecting it where it exists. In the imaginary societies, however, which, during their early stages, should not admit that the true meaning of perfection is known, the selection of candidates and their advancement must almost necessarily be left to the general body of members who, out of jealousy of the superior grades, would see to it that advancement in the higher ones should be even more difficult than in the lower ones.

The ancient Chinese system of ennoblement might with advantage serve as a model for the advancement process in these societies. Each male or female member would have to be passed through a grade which was one degree lower than that of his or her lowest grade parent. They would have power to rise two grades during life but no more, so that under favourable conditions they would rise to one grade higher than their parents whereas unfit members would die in a grade which was one degree lower. Under such a rule the Villiers, Wellesleys and Churchills could not have risen from plain Mister to Duke in one generation, for it would have taken seven generations of eminent men to attain this rank; it would also take seven generations of mediocrities to remove a Ducal family out of the aristocracy. Such a shedding process would not readily be adopted in the suggested societies, if the advancement of members were vested in the higher grades, for their inclinations would naturally be to make it easy for their own children to rise more rapidly than others. Of course such a principle could not be carried through unless all voting were made compulsory.

Most aristocracies have suffered degeneration on account of their exclusiveness, partly because they separated them-

selves more and more from the multitude amongst which they lived and partly because no new blood was infused into their ranks. This disadvantage would be removed by encouraging a steady flow of candidates or initiates, who should however adduce evidence that at least their two parents and four grandparents were all healthy in body, good in character, and intellectually not below the average. Most careful records would then have to be kept of all who entered as members and subsequent advancement or non-advancement would have to depend on recorded acts and on the ever accumulating evidence.

What these acts should be would have to be decided in the course of time, but supposing that during a national calamity, like the invasion of Prussia by Napoleon, any of the members of the society should copy the example of the Prussian Junkers or Nobility, then there would be ample justification for degrading them to the lowest ranks, a punishment which the Prussian King neither had the power nor the wish to inflict. If the suggested society were to be recruited from amongst the plutocrats, they might doubtless decree that the most meritorious acts,—those for which advancement should be granted—would be the building of Churches, Hospitals, Observatories, Colleges, and Libraries, their endowment and the founding of Scholarships, but seeing that these acts are possible only to the rich, who already reap the reward of having their names associated with their charities, it would probably be found more desirable to favour those who, copying the ancient Greeks, consider it to be the greatest public virtue to have discovered and assisted youths and men who in after life became eminent citizens. This means that the true educationalist, not as now the mere crammer for examination, would rise in public estimation, and women too could reap honours, especially mothers, whose wonderful influence on the moulding of character, is only too often forgotten even by their own sons. A man or a woman who discovers a youth, who if he is to be a success

had better be sought amongst the upper classes, and either educates him or assists him in his learning, and who perhaps starts him in life or gives him that pecuniary support which will relieve him from the drudgery of earning a livelihood and thus allow him to devote his energies to noble works, such an one who discovers and rears a Humphrey Davey, a Faraday, a Clive, a Nelson is not only conferring a benefit on humanity but will live to enjoy a parent's pride in his protégé, and like Crassus with regard to Cæsar, will have his name intimately associated with a greatness which his own deficiencies hinder him from attaining. Many other acts will suggest themselves as meriting advancement, such as noble deeds of statesmen and soldiers which reveal the existence of reliable characters. Then, too, there is the creation of new ideas, including inventions which go far to establish the existence of reasoning powers in their originators; possibly too strength, agility, and grace may be found to be the bodily reflection of a harmony which is perfection but which has had no opportunity of revealing itself in acts.

After a certain number of generations the relative positions of one of the high grade members of such a society, and of a Kæmmerer, the quintessence of Austrian aristocracy, would be as follows: No man can be a Kæmmerer and wear the distinctive gold braided key-hole by which he is known unless all his ancestors for seven generations, viz., two hundred and fifty-four individuals, were of noble birth. What a glorious heraldic picture would be a pyramid of their respective coats of arms! But supposing that the back of each shield recorded the characters, intellects, good and bad acts, and the healths of these two hundred and fifty-four ancestors, then it is almost certain that amongst a mass of nobleness there would be discovered individuals with mean, faithless, and cowardly characters; occasional acts deserving of criminal punishment and men with bodily deformities and diseases,

deficient intellects and even imbeciles. On the other hand, the members of the suggested society would not be able to show numerous coats of arms, but every one would know that such high positions could not have been attained unless all his ancestors for say seven generations had been above the average in one or more respects and that they had all done worthy deeds. If a man with such an ancestry and a Kæmmerer were to offer themselves for some very important public service, it goes without saying that, other things being equal, the former would be selected. The most striking point about the two men would be the difference in the methods adopted of rearing them. The high grade man would have been artificially evolved on lines based on an ever increasing knowledge of heredity and evolution, including a drastic shedding process of unworthy material, which takes the place of the natural law of the survival of the fittest. Of the Aristocrat it may be said that the founder of every family is a "sport," an organism which is much superior to the parent stock and which by rearers of plants and animals is carefully bred so as to perpetuate the special qualities which have suddenly appeared in it. The King is supposed to discover human "sports" and to ennoble them. That this is the principle adopted in Europe is proved by the fact that a title, the outward indication that an ancestor was a "sport," cannot be inherited through brothers or sisters of the recipient of the first honour. The subsequent progress of the European aristocratic families does not follow the lines which are adopted by breeders. The aristocratic "sport" usually intermarries with the descendants of other aristocratic "sports," but he may and often does intermarry with girls of unknown parentage who may have made themselves attractive on the stage, or he may intermarry with foreign and even oriental women. Such heterogeneous crossing cannot be expected to perpetuate or to accentuate the special qualities for which the first ancestor was ennobled. In German aristocratic

families there are laws which are above the law of the land and which prohibit children of mésalliances from inheriting their father's title, but in no European country has an Aristocracy adopted a shedding process, with the result that they have not been the reliable philosophers and guides of their respective states which Charlemagne, the founder of the feudal system, may have been justified in expecting. He leaned on experiences gained amongst communities which seem to have been thoroughbred until they left their German forest homes and mixed with so-called Romans, who were by then a mixture of Italians, Gaels, and even Orientals.

RESERVE POWER OF STATE.

It has already been pointed out that the Character, or the Individuality of the State is its surplus Energy, which like the character of a strong man should be able to sweep away all nostrums and lead a healthy and perhaps natural life. Where has the surplus energy of the State to be looked for? Naturally amongst those who have not to work for a living. In ancient Greece it was represented by the Freemen of the towns whose slaves laboured for them, and who alone had leisure and culture and quite correctly grasped their true position by insisting that they were the only ones to bear arms and defend the state. Rome started on the same principle but was forced into allowing at first surrounding tribes and latterly German mercenaries to represent the surplus state energy. They subdued the Carthaginians but learnt of them that the power of a state does not lie only in the numbers of Freemen who are trained to bear arms, but also in the surplus energy which comes from trade and from riches. Rome at first encouraged trade because it increased her power, a military one, but she ended by absorbing or municipalising all industries.

England's surplus energy has been her mineral wealth, notably her fuel resources, which still enables one artisan to do as much work as twenty or one hundred men used to do. The state as a whole has reaped great advantage from this fortunate accident, and generally speaking, England has also been fortunate in finding a host of able statesmen amongst her children to harmonise conflicting interests, but the advantage has not been exploited by the state as it would have been exploited, say by modern Germany or ancient Rome. That is due to difference

of national character. English statesmen have, almost without exception, had no wish to build up a World Empire. Yet, even allowing that the English race is not Imperialistic, like the Roman Patricians, one cannot help asking what would have become of Rome if it had wasted its surplus energy as England has been and is wasting hers? Slaves and serfs were then as much national surplus energy as mineral fuel is to-day, but Rome neither gave away her prisoners of war nor other slaves nor sold them. If, as often happened, she had too many, she preferred cruelly to destroy them in the arena. Would it not have been suicidal on her part to supply her neighbours with this surplus energy? And is not England cutting her own throat when she sends abroad her invaluable fuel resources with which her enemies build up reserves of power which can be made available against her at any instant? England need not destroy her coal, but she also need not disturb this reserve for the benefit of her enemies. The state gains nothing by this export, for it is surely no advantage that a few millionaires should grow rich, nor that what looks like a state duty should be delegated to miners who restrict output by refusing to work more than thirty hours a week. This is not an ideal condition, for it is utterly wasteful, if for no other reason than that this policy makes it impossible to work thin seams. But it is now too late to attempt to restrict the output to a small number of mines, a procedure which would be in harmony with other strivings of nature, for a maximum of effect would be produced with a minimum of means.

It is not only as regards fuel that England is assisting her enemies; she supplies them with all the labour saving inventions of her great men, and thus enables them to increase their striking reserve, and on the top of all these favours, England calmly allows herself to be treated like a conquered weakling, paying tribute to her neighbours in the guise of foreign tariffs and allowing them privileges, such as trading along our coasts and between our

colonies, which are denied to her. It was not on this principle that Cromwell laid the foundation of English maritime supremacy, when he even refused Dutchmen the carrying of non-Dutch goods to England; nor was it on these principles that England fought against Napoleon's continental trade barrier, and successfully broke it down. For some odd reason it has become an article of faith with those who look up to the wealthy merchants for guidance that these unnatural conditions should rather be encouraged than fought against, and yet they only benefit the few who know how to pull the ropes. Even the man in the street ought to be able to see that where one nation tapped another's wealth for its own advantage and England's harm, almost any steps, even wars, have been justifiable to counteract such actions, and these have certainly been undertaken by England against France, India, China, and Japan for this very purpose of breaking down trade barriers.

Take the case of Germany. Her British imports amount in value to about 40 millions sterling. From these an import duty of about 10 millions is collected and used, say for building powerful warships. England in self defence has, therefore, to spend 20 millions on warships. Now assuming that the cost of these goods is just 30 millions, then, seeing that the Germans are willing to pay 50 millions for them, the difference should reasonably come to England. Instead of that England has to pay 20 millions in additional armament so that she annually loses 30 millions over a transaction involving 40 millions. This sort of business does not reflect credit on a nation of shopkeepers.

In the chapter on political economy the example of a rotating flywheel representing the stored up energy of a steam engine was given to illustrate the nature of the rapidly available energy of reserve capital. Other contrivances of varying degrees of excellence may be cited. There are hydraulic accumulators which consist

of heavy weights which are lifted by the surplus pumping power of an engine, and which almost instantaneously can be used to raise a passenger lift or to produce thousands of tons of pressure on steel forgings. There are the electric accumulators which store up electric energy, while there is a surplus, and give it out when the supply runs short or the demand increases. There are the huge gasometers of our towns, which during the day, when the gas supply exceeds the demand, are being slowly filled, while during the evenings when the demand has enormously increased, the stored up gas is consumed.

Another class of mechanisms is non-reversible as regards surplus energy which with them is entirely wasted, generally by friction. Clocks are worked on this principle. For each swing of the pendulum a small amount of surplus energy is provided, which may all be wanted when the lubricants get tough and friction increases, but which is wasted with each tick as long as everything is in order. This wasted energy is lost and is not available when the clock spring has run down. The governing device in the clockwork of phonographs, etc., is of the same nature. The spring is made enormously stronger than required for driving the train of wheels at a given speed, and the surplus power is wasted in friction in order to keep the speed perfectly steady. Electric resistances attached to motors act on the same principle: when too much electricity is available for the driving work required, a large part is wasted by converting it into heat, which cannot be recovered when the supply falls off or when the demand for power increases. An intermediate arrangement for disposing of surplus energy is represented by various governing devices, notably on steam engines, temperature regulators of incubators, etc. They shut off or reduce the supply of steam or gas when it is not wanted, and increase it with increasing demand, while some are so arranged that if any accident occurs the engine is automatically stopped. This class of governors includes the safety fuse

of electric installations, and the various devices for stopping power looms whenever a weft or warp breaks. Regulators of this class are tied to the condition that there must always be more power available than required, but none is wasted.

Very similar devices are attached to states. The most wasteful of these is the very simple one of mere waste of surplus power, of which the grandest and most lasting example is the building of the Pyramids. Egypt no doubt was at one time, thanks to government irrigation, producing more food, and therefore more energy than it needed, and in the same way as sailors, in order to keep them out of mischief, are employed in uselessly washing clean decks and polishing brasswork, so also a large portion of the Egyptian population was employed in hewing stones and carting them about. This is the communist's ideal for a country which is naturally too rich for its inhabitants. He asserts that the state should municipalise all trades, and a surplus population, which would gladly thrive luxuriously on money-lending and corn cornering, should be compelled to build pyramids or make bricks for useless monuments. The surplus energy represented by millions of labourers was in Egypt as much a waste as drilling them for military manœuvres would have been, for Egypt, as long as the horse, the camel and the elephant had not been domesticated, could not expand across surrounding deserts. Unfortunately the monumental surplus energy did not even enrich the state which, it is believed, was a huge municipal trading concern like Peru under the Incas, requiring no money for internal wants, so that it would not be able to store any energy against the day of trial when the Hyskos and later the Assyrians attacked it.

A similar case of wasting nature's surplus energy is illustrated in the " green vaults " of Dresden. About the time of August the Strong, Saxony, due to the discovery of great mineral wealth in the Harz mountains, was one

of the richest states of Germany. Her ruler expended this surplus energy in the purchase of gems and ornaments, which were as unavailable reserves in case of need as were the Pyramids of Egypt. Even nowadays, no American multi-millionaire would pay anything like their value for some of the gems which are as large as decanter stoppers. Prussia, although a much poorer state than Saxony, was during this time utilising all her surplus energy in buying arms and training a surplus population to bear them, and when a few years later Frederick the Great found himself possessed of this surplus striking power, which like that of an engine or hydraulic accumulator could be made instantly available, he simply raided Saxony, and trusted to find amongst the plunder such excuses as he deemed necessary to make. He set no value on Saxony's monument of her surplus energy, which, in his eyes, represented mere waste, and the collection of August the Strong is undisturbed to this day. Even the rapacious Napoleon left it, like the Pyramids of Egypt, untouched.

Recently Germany has sprung into being, and the United States loom large in the near future. Germany is now guided by the principles which swayed Frederick William of Prussia, and all the surplus energy of the state, which is very formidable on account of the coal resources, is now devoted to maintaining a powerful fighting force ever ready for an aggressive dash either at France, or Russia or England. Trade and industries are fostered, but only because they have been shown to be capable of providing the necessary reserve of energy, and the state takes care that this reserve shall be immediately available when wanted. Its military system, as everyone knows, consist in training the whole nation to arms. All the railways and their rolling stock are absolutely under the control of the state, and not so many years ago it was discovered that all the necessary embarking arrangements had been made at Emden on the German North Sea coast

for rapidly and safely shipping a large army. Naturally the neighbourhood of Harwich, where disembarkation could be easily effected has had to be converted into our most powerful fortress, and naturally, too, the English fleet, which used to be scattered all over the world, has had to be concentrated in home waters. The Clyde has had to be fortified, enormous dry docks have had to be built, and the cutting of a ship canal from the Forth to the Clyde has become an absolute strategic necessity.

There may be an advantage to commercial men in one nation assisting others to become harmfully powerful, but is that state the most perfect, the most happy state whose clique of plutocrats is the richest? Cannot the surplus energy, which must somewhere exist if a nation's character has to reveal itself, be used for bettering the state? Supposing for instance that England has a mission, say to civilise the world, would it not be better to utilise her surplus energy in perfecting her own civilisation, her own education, before educating others?

Surpluses of national energy were formerly represented by armaments, now they are represented not only by armaments but by several years training of conscript or voluntary armies, and above all by capital, partly ready money, partly credit, and as it is the latter of these which is capable of acquiring enormous dimensions, every nerve is strained by the more aggressive nations to increase it. In former days, very little monetary value was attached to the promises of kings; they were mortals, they might engage in disastrous conflicts, or, and this happened only too often, they might never have intended to repay loans, no matter whether they were raised for their personal use or for that of the nation. From a money-lender's point of view, therefore, kings used to be considered untrustworthy individuals. The Italian Republics, and above all England, from the time of Edward I, showed that almost unlimited credit might be obtained by such kings and presidents as granted constitutions and allowed elected members of

parliament to fix the money contributions of the people. The French Revolution clinched the argument, and more or less reluctantly even the most autocratic rulers are consenting to let the national purse strings be held by their subjects. In fact Russia was only able to raise her 1904 loan on the understanding that her people should be allowed to control her taxes, but it would almost seem as if her lenders had been duped.

One of the most important of modern reserve powers of a state is the credit which it enjoys in the money market, and which, on occasion, will reveal the national tendency. As just indicated, this reserve power can be increased by adopting a constitutional form of government, though with past experience of the fickleness of the plebiscite, which is merely the predominance of the thriftless in a state, a real lowering of the franchise does not necessarily mean increased national credit as has been demonstrated in England, and where credit fails money can only be raised on the pawning system, which is carried out in some uncertain states by guarantees on monopolies, customs, railways, etc., and is of course quite beneath the dignity of first class commercial states. But even they are not quite satisfied with their financial credit, for in cases of emergency it rapidly sinks, and is then generally disorganised; besides, if money loans, as will be suggested later, were ever to be declared contraband of war, states would have to rely on their own resources, on their own flywheel, and that is evidently working unsatisfactorily. It is in a sense improperly keyed to the driving shaft, for during times of plenty it does not absorb surpluses and during emergencies it almost stops moving.

Private individuals can invest their surpluses in state securities; the state can at best, if it has a debt, reduce this during good times, but it is thereby reducing the flywheel effect, for large internal loans are a financial advantage to a state, as they are of the nature of bills of

accommodation, and one day perhaps political economists, if they become real scientists, may discover that it is not good to have no national debt. Certainly the financial troubles some years after the Franco-Prussian War seem in part to have been caused by the rapid disappearance of available capital, brought about by Germany paying off her war debts and by America reducing her national debt. At any rate these two countries suffered most at that time, whereas France, who had just saddled herself with an extra five hundred millions of debt seemed, much to the annoyance of Bismarck, actually to have thrived on it. The same thing happened in England when, under William III, large national loans were first raised, for in spite of predictions of speedy national ruin, and much to the agreeable surprise of all concerned, the prosperity of England increased with leaps and bounds whenever a new loan was raised, or as one might say, each time the state and her people drew new bills of accommodation on each other. The same amount of coin remained in the country, and yet thousands of people were richer by the amounts loaned. Apparently too Germany is at present thriving on the large loans she has to raise for increasing her fleet.

If then, the flywheel effect of the state is to be perfect, something should be devised which will not only give out power in the days of deficiency, but which will absorb it in the days of plenty. The state, while carefully avoiding becoming a state trader, like Rome, and monopolising mines and industries, might become a shareholder—not sole proprietor but merely a shareholder—in such undertakings as posts, telegraphs and telephones, in railways and canals, and in lands. It could during years of plenty invest increasing sums in these undertakings, and in cases of emergency it could sell its shares, probably at a premium. This would be a financially ideal condition, for supposing that at the outbreak of a war a state should be holding nine hundred millions worth of railway shares,

out of a total of a thousand millions, a part being always left with the public so as to fix the market price, it is evident that if the dividends at the time stand at 3 per cent., and the value at £100, the public will know that during the war time there will certainly be an increased traffic followed by improved business, so that for the next few years a dividend of 4 per cent. will be a practical certainty and they will pay accordingly; and then also, as the state will not be able to rebuy shares immediately after peace is declared, there should be every prospect of enjoying 4 per cent. for a considerable number of years, and such shares will doubtless sell at from £120 to £130. The same with canal and with Post Office shares. With permission to invest savings the state would have two strings to its bow in case of emergency: it could either sell shares or it could raise loans, whereas at present it can only indulge in the latter expedient.

The fiscal effect would be of even greater advantage in so far as that it would remove all tendency, which is now the bane of political life, of each sub-state in succession to aim at power in order to roll the burden of taxation from its shoulders on to others. Under the above conditions, the taxing arrangements would practically become fixtures, provided of course that a taxation scale is adopted which will leave a substantial surplus, for then to a certain extent it would not matter who paid the taxes, and the ideal system, which, under present conditions is unfortunately one of great hardship, could be carried out, *i.e.*, by taxing hardly anything but incomes. Supposing that a condition were brought about (which would probably be unattainable even after a full generation of 30 years) according to which every income had to pay 25 per cent. taxes, then both the employer and the employed, the business man and the shareholder, would know that £100 means £75, and they would fix their demands, services, and arrangements accordingly. Everybody would know that with the average large surpluses which

would be arranged for, and with a large reserve share capital to meet emergencies, no change would be sanctioned in the taxing scale. At present the bane of political life is that each would-be member of parliament has to promise in as carefully worded terminological inexactitudes as he can command, that he will try to get those taxes reduced which most of his constituents pay, and will try to saddle other people with them; only recently the unedifying spectacle was witnessed of the government of the day making a costly fiscal concession in sugar in order to ensure the election of one of their supporters in a jam boiling town.

At present no one knows which parliamentary interest will effect a change in taxation, or whether the income tax will be abolished, as was once offered by Mr. Gladstone, or increased to perhaps 3/- in the pound. It is manifestly unfair that any special class should be suddenly called upon, as was the case during the Boer War, to bear an undue portion of the cost, simply because with a stroke of the pen the Chancellor of the Exchequer can clap an extra shilling on to the income tax, whereas far greater difficulties are encountered and great disorganisation caused when other taxes are meddled with and new ones created. As an extreme, it may even be asserted that if the conditions sketched above could be attained, gradually of course, it would be almost immaterial who paid the taxes, provided they were definitely fixed for long periods. The revenue might come entirely from the land, which would have a lower but steady value. It might come entirely from imports, and not even the manufacturer would suffer, for he and his workmen would be relieved of their present heavy taxes, or it might come out of incomes, which would naturally be raised proportionately, but the one condition on which the satisfactory working of this arrangement would have to be based would be that there should be none of the present sudden

disturbing readjustments of taxation, but that they should be of an extremely gradual nature.

The speeches of the Chancellor of the Exchequer would then be reviews of his stewardship. At present they are read with feelings which are somewhat related to those of a prisoner to whom a communication is being read which may mean hanging or a reprieve. This in itself is an incongruity, not necessarily worth removing because it may spoil a few breakfasts, but because it is an indication of the great evils which are sketched above, that much of the constant political and civil war is due to the unstable and ever-shifting taxations, which are the necessary consequence of the present inability of the state to act, as every saving individual is allowed to act, and invest his surpluses in profitable undertakings.

A reserve of power, in addition to being a reserve, is, as the above possibility shows, generally accompanied by other advantages. Thus even credit raises a person's social position, and national credit raises a nation's power for good or evil. Military training, too, being an educational process, elevates a nation, and ready money, gold and other reserves in banks and state coffers, besides being the most immediately available resource in case of war and during financial crises has the effect of attracting trade, more especially trade in money. Is it not possible that reserves in other commodities than gold may offer the double advantage of being not only surplus energy but something in addition?

The cause of the commercial prosperity of London has been a difficult problem for many students of history. The enterprise of its people may have been one cause, but then the growing prosperity of a town generally does attract enterprising spirits, and one wants to know why London has always been growing. Amongst London's advantages is the very important one of the pulsating river Thames, which permits barges to move up and down

without sails or oars; but probably the chief cause of London's commercial pre-eminence in the past was the safety it could offer as regards property, and especially the security against confiscation of merchandise to which every town on the Continent seemed more or less exposed. The occasional sacking of a town like Magdeburg or Antwerp must over and over again have raised the wish in the breasts of merchants of all the Hansa towns to have their goods safely housed in London, for there they were not exposed to the possible ravages of a Tilly, Alva, Turenne or others. Almost naturally London became the great storehouse of Europe, especially during the Napoleonic wars, and when the various London docks, with their admirable warehouses were built, which enabled goods to be stored and bought and sold by warrants, practically all large business transactions had to be done through London, and markets of the most important commodities were established there, regardless of the incongruity that London produced nothing. Tea, ivory, silk, spices, etc., still have their homes in London, while coffee, tin and copper have only recently drifted away to other towns.

The departures of these markets are due to two causes. Continental towns are more secure than they used to be even 50 years after the Napoleonic ravages, and new warehouses have been built there, whereas London, although it has increased its dock accommodation, has added practically nothing but transit sheds in the way of warehouses. Not only does London store relatively less than it used to do, but absolutely less of some articles, and for these the London market is gradually dwindling into insignificance.

London trade is too vast a subject to be here discussed in anything like detail, but for the sake of raising the question of a possible grain storage, which might be made to represent national surplus energy, the more simple subject of cotton storage may be touched upon. Man-

chester has been the leader in many things, not forgetting the Saturday half holiday. Manchester has also converted herself into a seaport in order to cheapen the import of raw cotton, for Manchester has had many serious frights about this article. Thus the Civil War in America meant starvation to her working population, and short crops, speculation, and engineers' encouragements of foreign mills have, times without number, created troublesome shortages. The very sensible idea is now being worked out of inducing England and her colonies to encourage Empire cotton growing, but the simpler remedy, not an alternative but an additional one, seems not to have had time to grow since the Ship Canal was built, and that is to provide large cotton stores, like the old London warehouses, in which more than a year's supply of cotton could be stored, either free of cost or at low rates which, like the London Bank of England discounts for gold reserve, would be regulated by the local reserve of cotton. This would have a threefold beneficial influence. Cotton famines would be a thing of the past, cotton prices would be steadied by a large reserve, and the cotton market of the world, with all its attendant advantages, would establish itself at Manchester. The prices of cotton would be fixed there, and not by a ring of speculators who may have bought up ungathered crops.

Almost exactly the same reasoning can be applied to the storage of grain. The ancient states of Egypt and Peru found it not only advantageous but absolutely necessary to store grain; it was their reserve energy, and since these stores have been destroyed the populations of these countries have been reduced to the numbers which can survive through a year of scarcity, though a plentiful year may be twenty times as fruitful as the worst. Nowadays steamship inter-communication enables the surplus of one part of the world to be transported to a famine suffering country, and populations are again increasing as under the beautiful ancient storage systems, but grain

transport by steamers is an innovation of only twenty-five years ago, and military experts, both British and foreign, confidently expect that by cutting off the English food supply for a few months, it will be possible to starve her people into subjection and spoliation.

England was impregnable under the feudal system, which, with its castles, was introduced by William the Conqueror, England was able to hold her own when the feudal system had given way to constitutionalism and mercenary armies. Philip's and Napoleon's Armadas were annihilated, but even if both projects had succeeded there would not have been starvation. Now things have changed, England is fed from abroad with a long, long spoon, and more than one ambitious ruler would wish to hold that spoon in the hope of gaining the riches, which, in his eyes, are being foolishly wasted by not absorbing the world into one Empire. Lovely dreams can grow out of the hoped for possession of England's food supply, and twenty-five years, not even a full generation, is too short a time, compared with 10,000 years of history, in which to say definitely that a William, a Philip, a Frederick or a Napoleon will not arise who will again make a grab at England.

The mere rumour of such an attempt, like the threat of Napoleon III, which called the defunct volunteers into being, would create a condition of things, though Englishmen are not given to panic, which might have the most serious and lasting consequences. Yet the remedy against fear of starvation is simple enough, and having proved efficient in Egypt and Peru, deserves at least consideration.

The storage of grain by the government, as is done in Germany for military purposes, does not seem feasible here, but there are hardly any objections to government encouragement in the shape of low or vanishing storage rates, on the same principle as the semi-governmental

encouragement of gold storages by the Bank of England discount rates. Years ago the commercial fraternity in London considered that great advantages would accrue to business in general if a reliable gold reserve were placed in London, and they considered that this advantage would not be too dearly paid for by an expenditure of 3 to 5 per cent., or £300,000 to £500,000 per year for every ten millions reserve. Neither London nor the nation was taxed for this desirable object, but certain valuable privileges and monopolies which serve the same purpose, were granted to the Bank of England.

Now the advantages of a large grain reserve are threefold. Firstly, this reserve would obviate any invasion panic; secondly, a large reserve of any commodity: gold, copper, cotton or grain, attracts business, and certainly creates leading markets; and thirdly, large reserves invariably steady prices, a market condition to which only speculators would object. Is it not worth while paying a price for these very material advantages? England already pays about the full storage price for the storage of English grain, which always amounts to from one quarter to one half year's supply, and has to be paid for somehow by farmers and importers, who unquestionably ask an extra 100 or 200 per cent. from the people for their expenditure. This saving alone would suffice to pay for free storage, and if once the chief market were established here, Indian and Colonial farmers might like to pay handsomely for this advantage combined with the security thus offered; and if the storage rates were made variable, like the Bank of England allowances or discounts, rising when the country's stored grain was less than the wished for amount, and falling whenever the standard was exceeded, the nominally free storage might be made to pay. Such a grain storage, unlike the Egyptian pyramids, but like the gold reserves of the various nations, would be a reserve power which could hardly be too dearly paid for.

One of the greatest advantages of concentrating a nation's surplus energy in stores, national armies, national undertakings, is that it is not distributed amongst sub-states and individuals, from whom it cannot easily be retaken in the hour of need, and who merely waste it in rivalries which damage the greater state.

STATE INCONGRUITIES AND DISCORDS.

In the chapter on personal Ethics the words immorality and crime have been shown to represent interferences of the human intellect with the instincts, but although states have in a sense a personality, and although certain interferences of states with individuals partake of the nature of a state immorality and crime, yet interactions of states and sub-states amongst themselves cannot always be called criminal or immoral. Nevertheless they seem to deserve a name which implies a certain amount of censure, and for convenience the word "incongruity" will be adopted, for it has the advantage that it embraces the ideas of crime and immorality, it being clearly incongruous that the interactions of reason and instinct, two departments of one nervous system and housed in a single body, should often be either immoral or criminal.

It was shown in the chapter on personal ethics that the intellect which had erected the edifices of civilisation was alone capable of seeing them, whereas the human instincts are absolutely blind with regard to them, and that one of the functions of reason is to guide the instincts of an individual amongst these edifices. Educational systems, the reasoning mechanisms of nations, do not, however, stand in exactly the same position to states as intellect stands to the individual, for state tendencies, which represent the instincts have been created by educational systems and are being constantly maintained by them. They are the very edifices of civilisation amongst which both individuals and states have to be guided; they cannot, therefore, be blind to their own existence, and it seems but natural that they should require a reasoning mechanism to guide them. It will, however, be found

that although state tendencies are created by one form of education, which is of the nature of a guide, they are perpetuated by another form which is of the nature of a memory effort.

On closer examination it will appear that educational systems are not what they should be; they are not all embracing reasoning processes of a state, but very one-sided ones, and are merely creators of state tendencies which may or may not, survive the attacks of later educational systems which have other ends in view. A perfect or at least broadminded educational system could act, as the intellect of human beings is supposed to act, by guiding states carefully amongst their own tendencies and amongst outside influences, but generally speaking, the education of one age merely interferes with what remains of numerous previous educational efforts, which are taught as classics and which have survived as state tendencies. Educational systems by adding new tendencies are largely increasing the existing state incongruities. A state and its tendencies might develop like a piece of perfect music, in which each new theme is in complete harmony with past and contemporaneous ones, even although it may supersede them, but unfortunately the numerous tendencies of which a state is composed react on each other as if they were imperfect musical themes containing germs of death or discord, such as drive the composer perpetually to change the key and to introduce occasional climaxes of noise in the hope of being able to make a fresh start with some simple theme freed from the interference of others.

This seems to have been the wish of Plato and other single philosophers and statesmen. They hoped to start new states with only one all embracing harmonious tendency, free from all incongruous past edifices of civilisation. Unfortunately for them many of these ruins were more ancient than the pyramids and refused to be removed, and the attempted defacements were merely additional incongruities to those already existing. Even

a cursory examination of any modern socialistic system, either patriarchal, imperialistic or communistic, will reveal that it merely adds a new and often the greatest incongruity to existing ones. One set of persons wishes to force *community* of property, of labour and of enjoyment on states which have grown to what they are because of tendencies to provide *security* for property, and they wish to insist on sub-division of labour and to reward thrift with the possibilities of purchasing pleasures. An imperial father of a nation whose ancestors have carefully guided the state in the past into the habit of leaving all difficult problems in superior hands, merely introduces an incongruity, when, for the purposes of acquiring relatively the same money credit as his neighbours, he expects his people to think for themselves by means of elective parliaments.

It is not intended here to inquire whether state harmonies or state incongruities are, or are not, in accordance with the strivings of the highest manifestations of energy, but in the same way as the mere consideration of what is popularly considered to be immorality and crime helps towards a better understanding of the strivings of energy, so also the mere enumeration of state incongruities may tend in the same direction. Possibly, too, by placing them in juxtaposition, as was done with the gods of the Mediterranean, when they were carted together into the Pantheon of Rome, the same ridiculous effect may be produced as with them. It was the beginning of their end. After all, conflicting state tendencies are mere patron gods, and deserve the fate of those who have preceded them. They are innumerable and the following rather long but incomplete list will convey some idea of their nature and of the difficulty of converting these incongruities into harmonies.

While wandering through the many subjects which will now have to be touched upon, it is desirable to realise that they represent manifestations of energy which differ from the more primitive ones only in so far as that they are

highly specialised, and that it is often as useless, *i.e.*, contrary to the true strivings of energy, to force uncongenial tendencies on a community as it is to carry water up a hill, for it is sure to run down again. It is true that the physical sciences are full of examples of one form of energy—for instance electricity—being employed against another say chemical affinity when splitting up water into hydrogen and oxygen—but all these results are unstable and a simple agent—a burning match—will cause the original condition to be re-established with explosive rapidity. Similar experiences are only too common with the human individual, a mere higher manifestation of energy. A born thief receives a good education which should change his character, and yet it only raises him from the level of a pick-pocket or burglar to that of a financial swindler. Quarrelsome people are taught to love each other, but all they learn is to combine to form irresistible armies. If therefore, in the following pages interfering influences are pointed out, it would be well, although this has been done only occasionally, to ask whether the unrests of to-day are not the strivings of ancient tendencies which are gaining more and more power, and also to ask whether a more perfectly harmonious working with nature would not be possible if our racial tendencies, as they existed before they were smothered by Roman and Oriental artificialities, were given freer play.

State Incongruities: Legislation.

Turning to the legislative and administrative institutions so many incongruities are found that they give the impression of being the very essence of states and lead to the flabby remark that states are compromises. This was not the case when communities were small, then plebiscites were possible and the wish or the tendency of the whole state could be ascertained with comparative ease.

The very sensible practice of closing the mouths of the young and inexperienced and encouraging old and well tried members of the state to speak and advise, was then a great advantage. In modern states some of the old principles persist, but having got mixed up with numerous modern developments, incongruities crop up at every point. To meet the difficulty of acting for large populations the Germanic tribes adopted the principle of grouping themselves in hundreds. In such small communities voting was practically compulsory, now this is only the case in Switzerland, Belgium and in Austria, and nowhere are the arrangements such that each vote shall carry equal weight. That Members of Parliament should be allowed to absent themselves from divisions without being fined is one of the most startling incongruities of our political system, and might be made to disappear when members are paid. Surely men who ask to be allowed to express a community's wishes are in duty bound to act, more especially if words are now to be classed as terminological inexactitudes and not to be relied upon. The ascertaining of the wishes of the nation is the ostensible object for which voting has been devised. Is that object a reasonable one? And if so, is it reasonable that the father of a large family should have no more influence than his son who has just attained his 21st year, who spends most of his earnings on worthless enjoyments and who is not as yet responsible for the bringing up of a new generation of citizens? Is it reasonable that a person who cannot read or write, or who as in Ireland, in order to be controlled by an agent, professes illiteracy, should have as big a say as an employer of labour, as a merchant who is in touch with all the world, as a learned man who is conversant with the doings of past ages? Is a householder's opinion worth no more than that of his butler? Why then place them on an equality as regards directing legislative work, policy and administration? Why prohibit Peers from speaking during political contests?

Have not they the leisure and generally the training and the inclination to inform themselves on these very subjects? Why encourage talkers, especially lawyers, to come forward as candidates? Why not silence would-be members of Parliament as Peers are silenced? Why not encourage true workers and not talkers—the wise men of the nation, its elders—to come forward as guardians of the nation's interests, as advisers in matters of difficulty? Belgium is the only country which has tried to remove at least some of these incongruities and, taking into account the local difficulties, the result is good.

Then, too, it seems so utterly incongruous that parliaments should decide about the arrangements of electoral districts. The decisions as to validities of elections, which used to be given by Parliament, have at last been delegated to lawyers. Why cannot these men be instructed to readjust the electoral districts after each census? At present it is impossible to get a newly elected Parliament to pass a reform bill because this is an act of the nature of political suicide, while a moribund Parliament, when re-arranging the electorate, always has an eye to the possible effect. Incongruous distributions are aimed at, and it is arranged that in some districts in the wilds of Ireland one member is elected by 2,000 voters mostly professing illiteracy, whereas other members have to solicit votes from 40,000 to 50,000 educated electors. Surely there would be no harm in fixing on this latter number for the average size of electoral districts and in gradually increasing it so as to reduce the number of Members of Parliament. What an additional blessing it would be if newspaper reporters would go out on a permanent strike as they did temporarily in Berlin. Then the talkers would not even trouble to be elected. Would it not be possible to arrange to have a controlling chamber containing men who would be elected for their deeds and not for their flow of words? The incongruities which have here been put as questions are more or less

patent to everybody, and that no doubt is the reason why the most glaring incongruity of all,—the publishing at elections of political lies, or terminological inexactitudes as they are now called,—should be encouraged. The political motto seems to be that all is fair in politics as in war. Why should this be? Politicians nowadays tilt at each other as did the robber knights of old. In the Dark Ages there were no police and no laws of the land, the community existed for the benefit of the knights, as to-day it exists merely for the benefit of the politicians, and these in turn are in some countries made to dance to the tune of the financiers or despots.

And what are politicians? They profess to be statesmen, and ever since the French Revolution they one and all wish to be considered creators of constitutions. Each new member carries in his pocket a bill which is to do wonders. He quite forgets that the original and still the chief object for which he has been elected, is to watch over the administration, to see that money is applied to its proper objects and not wasted. Yet probably not more than six nights per annum are spent on this work, the remaining time being devoted to change of laws. Members of Parliament are proud of being called legislators, creators of laws, superior in their own eyes no doubt to the Greek gods, who were immortal it is true, but subject to laws which they could not make or unmake.

Members of Parliament are hardly to blame for this feeling because they find themselves in a position which is very similar to that of people who volunteer to go on theatrical stages to watch a conjuror's tricks. The public fully believe them to occupy their exalted position as their representatives, to watch on their behalf and to reveal what tricks they may discover. But these privileged onlookers, though they may have had disinterested intentions while stepping on the stage, cannot resist the temptation of wishing at least to understand the tricks,

and they soon discover that this object would be interfered with if they were to reveal all they saw. The public wishes to marvel and to be tricked, not to be taught. Their representatives therefore hold their tongues and thus the audience is really not represented. Members of Parliament offer to go to the House to control the administration; no sooner, however, are they under cover than they adapt themselves to the prevailing flattering idea of being creators, conjurors and dispensers of power.

And what a mess they do make of the laws. There are miles of them and ramifications innumerable. Each Act requires an amending Act, and that requires another into all infinity. Even when common law practices are codified, the results are worse confusion than before. Why is this? Instead of the law being the natural expression of popular feelings of fair play, customs of the trade, or equity ideas, or instead of its being the work of sober and well trained statesmen, bent on reproducing the expressed wishes of the people, it is the invention of one set of faddists intent on damaging the interests of their opponents who in turn do their best to mutilate these creations out of all recognition.

There are about 160 lawyers amongst 670 members. This looks like an advantage. Unfortunately that is not so. A phalanx of barristers represent not the people but their own profession, and being members of a closed corporation, with wonderful anti-state codes, men who may not be spoken to except through solicitors they are out of touch with humanity and constitute a class apart to a far more marked degree than could be said of the old nobility. These men are attracted to the House because all great law offices are filled only from amongst its members. All Lord Chancellors, the Attorney-Generals, and Solicitor-Generals must have the gift (and it is one of their greatest), of talking ignorant multitudes into believing them to be great statesmen. Barristers are memory

machines, not thinkers. No lawyer has been a great statesman. Note what a wreck was made of the French Revolution by such lawyers and writers as Marat, Robespierre, Danton, Hebert and others, and how even these were outdone by a boy like St. Juste. It was left to workers and thinkers like Carnot, Napoleon, and others, not to trained talkers and writers, to re-erect the shattered constitution. Doubtless there were other thinkers who could have carried out the task, but the sudden chance which liberty of speech and writing gave to men who had practised these arts, also drowned the real workers and administrators, and for a time the leadership fell to a profession whose greatest glory has always been to prove by words, that black is white, that a criminal is a saint, and that a liar, or rather a terminological inexactitudinarian, is the personification of truth and honour, and deserving to be trusted with the highest administrative functions.

It must be remembered that France had had an earlier experience of the harmful influence of the legal element in deliberative assemblies. The French parliaments of Louis XII. consisted of lawyers, who brought themselves into such disrepute that they were disbanded without being regretted even by the people, and they thus helped to pave the way for the Revolution in which they played such a disgraceful part.

Yet everything is done to attract lawyers into the House. It is truly monstrous that two-thirds of our high court judges have had to become strong political partisans before they were appointed to occupy posts where impartial justice has to be dispensed. The names of the present judges and high legal functionaries who have been engaged in political contests, also their present salaries and the parliamentary divisions which they represented are as follows (unsuccessfully contested divisions are bracketed):—

ENGLAND.

Rt. Hon. Lord R. T. Loreburn, Lord High Chancellor £10,000. Hereford and Dumfries.

Sir R. D. Isaacs, Attorney General. £7,000. (Fees about £5,000.) Reading.

Sir J. A. Simon, Solicitor General. £6,000. (Fees about £4,000.) Walthamstow.

Rt. Hon. Lord E. MacNaghten, Lord of Appeal. £6,000. Co. Antrim.

Rt. Hon. Lord W. S. Robson, Lord of Appeal. £6,000. Bow and Bromley.

Rt. Hon. Lord J. Atkinson, Lord of Appeal. £6,000. N. Londonderry.

Rt. Hon. Sir H. Cozens Hardy, Master of the Rolls. £6,000. N. Norfolk.

Rt. Hon. Sir F. Moulton, Lord Justice of Appeal. £5,000. Clapham, S. Hackney and Launceston.

Rt. Hon. Sir W. R. Kennedy, Lord Justice of Appeal. £5,000. (Birkenhead) (St. Helens.)

The Hon. Sir R. Neville, Judge of the High Court of Justice. £5,000. Liverpool.

The Hon. Sir H. T. Eve, Judge of the High Court of Justice. £5,000. Ashburton.

Rt. Hon. Lord R. E. W. Alverston, Lord Chief Justice. £8,000. Launceston, Isle of Wight.

The Hon. Sir W. Grantham, Judge of the King's Bench. £5,000. E. Surrey, Croydon.

The Hon. Sir J. C. Lawrence, Judge of the King's Bench. £5,000. S. Lincolnshire.

The Hon. Sir E. Ridley, Judge of the King's Bench. £5,000. S. Northumberland.

The Hon. Sir C. J. Darling, Judge of the King's Bench. £5,000. Deptford.

The Hon. Sir W. G. F. Phillimore, Judge of the King's Bench. £5,000. (St. George's, Hanover Sq.)

The Hon. Sir T. T. Bucknill, Judge of the King's Bench. £5,000. Surrey.

The Hon. Sir T. G. Horridge, Judge of the King's Bench. £5,000. East Manchester.

Rt. Hon. S. T. Evans, President: Probate, Divorce, and Admiralty Division. £5,000. Glamorganshire.

SCOTLAND.

Rt. Hon. A. Ure, Lord Advocate. £5,000. Linlithgow.

Mr. W. Hunter, Solicitor General. £2,000.

Rt. Hon. Lord (A. G. M.) Dunedin, Lord Justice General. £5,000. Bute.

The Hon. Lord E. T. Salvesen, Lord of Sessions. £3,600 (Leith Burghs.)

Rt. Hon. Lord (C. J.) Pearson, Lord of Sessions. £3,600. Edinburgh and St. Andrews University.

Rt. Hon. Lord Kingsbury, Lord of Sessions. £4,800. Edinburgh and St. Andrews University.

The Hon. Lord (D.) Dundas, Senator of the College of Justice. £3,600. (Linlithgow.)

The Hon. Lord C. K. Mackenzie, Lord of Sessions. £3,600. (Mid Lanark.)

IRELAND.

Rt. Hon. Sir S. Walker, Bart., Lord Chancellor. £8,000. Londonderry.

Rt. Hon. R. Barry, Attorney General. £5,000. North Tyrone.

Mr. C. A. O'Conner, Solicitor General. £2,000. Liverpool.

Rt. Hon. H. Holmes, Lord Justice of Appeal. £4,000. Dublin University.

Rt. Hon. R. R. Cherry, Lord Justice of Appeal. £4,000. Liverpool.

The Hon. Justice D. P. Barton, Judge of the High Court. £3,500. Mid. Armagh.

Rt. Hon. J. Ross, Judge of the High Court. £3,500. Londonderry.

Rt. Hon. Lord (P.) O'Brien, Lord Chief Justice. £5,000. Solicitor General.

Rt. Hon. C. Palles, Lord Chief Baron of Exchequer. £4,600. Solicitor General.

Rt. Hon. J. G. Gibson, Judge of the High Court of Justice. £3,500. Liverpool.

Rt. Hon. D. H. Madden, Judge of the High Court of Justice. £3,500. Dublin University.

Rt. Hon. W. Kenny, Judge of the Court of Justice. £3,500. Dublin.

The Hon. G. Wright, Judge of the High Court of Justice. £3,500. Solicitor General.

The Hon. W. H. Dodd, Judge of the High Court of Justice. £3,500. (N. Antrim, Tyrone.)

As the total salaries of these posts exceed £200,000, it is not surprising that there are at each General Election about 300 lawyer candidates, anxious at least to appear as if they were intensely biassed partisans. Fortunately for the reputation of the bench the political convictions of lawyers are easy-fitting gowns, and are laid aside without difficulty.

The expense and the trouble of having to engage in the uncongenial task of contesting an election is a very serious burden to the members of the legal profession, and the majority of lawyers, both in and out of the House, would welcome some arrangement by which they could attain the coveted posts without having to be exposed to the baneful influence of politics. It may be safely assumed that each of the 300 parliamentary lawyer candidates spends about £500 a year in nursing his constituency; this means that the legal profession pays annually about £150,000 towards football, cricket, and other clubs and institutions and charities which do not interest them, and this is done for no other purpose than that a limited number of their profession shall receive about the same amount in state salaries, yet the large body of lawyers would gladly see the six posts of Attorney-Generals and Solicitor-Generals given to the best men, and not to the strongest partisans.

The business of these men should be in the law courts, and not in the House. The general public, too, would prefer to know that these men were busily engaged on their legal duties, which are paid for at the rate of about £30,000 a year. The public would also prefer that parliamentary explanations of legal matters should be given in plain, non-legal English by a non-professional Minister to whom matters have been expounded. There is certainly no plausible reason why the legal profession should be officially represented in the House by six of its members, whereas the Army is not represented by soldiers, nor the Navy by sailors. Clergymen may not even be elected into the House and merchants and their interests, or rather their departments, such as the Board of Trade, are also not represented by professionals. Why, then, should the legal profession be favoured to a quite exceptional degree? The explanation is a simple one. In the Dark Ages the nobles, let alone the people, could neither read nor write, and Churchmen were the only ones fit to undertake the duties of Ministers. With increasing education, biblical knowledge was of less practical value than legal knowledge; therefore lawyers were drawn into the Government, and Bishops, seated as they were in the House of Lords, became non-politicians. In the meantime the lawyers have created a host of lucrative posts for themselves, and there they remain. They may as well keep the posts, but our deliberative assemblies would get on much better without the legal element, which, as is well known, is practically non-existent in town and county councils.

It seems quite natural that the abilities of a soldier and of a sailor should be perfected by constant training in the field and on the sea, and although Roman generals did qualify as Senators, the general opinion now is that these very important branches of State should be officered by men who have not dabbled in politics. Is the impartial administration of Justice so unimportant a business that

it may be officered by men who have to qualify as amateur politicians? It is utterly unlikely that the cause of Justice is furthered by placing it in the hands of politicians, and it is certain that the representative character of the House of Commons is not improved by encouraging lawyers to congregate there; yet at present one-fourth of its members are lawyers, and these again are over-represented by having fifty per cent. of the Ministerial posts assigned to them.

If the legal profession were in harmony with the general public, this would not matter much, but their dislike of forceful measures and their tricks, stamp them as un-English, and almost Oriental. The legal profession is a closed corporation with a code of honour which is in some respects opposed to the spirit of the customs and laws of the land. It is true the social code of the upper thousand of a hundred, or even fifty, years ago was in many respects also contrary to the customs and laws of the land, and to a nation of shopkeepers, whose business transactions are based on the principle of strictly fulfilling monetary obligations, it does seem strange that a sub-state like our upper Society should have countenanced a law according to which anyone who did not pay his illegal gambling debts, euphoniously called debts of honour, would become an outcast, whereas no social punishment would be inflicted if, in order to pay these debts of honour, the tradesmen who had supplied goods, or the confiding friend who had received no consideration for the bills he had signed, were swindled out of their money. A caste which acted on these principles could not by any stretch of imagination be said to be in harmony with the commercial spirit of the community, and the same may be said to-day of the legal profession. Thus, in spite of the law of the land that a consideration must be given for money payments, barristers accept refreshers without complying with this condition. In fact these monies change

hands as between swindlers, bribers, and thieves, for they have to be in gold, and formerly no receipts used to be given. There is no other honest business transaction done in this commercial country on these lines.

Another point in which the legal profession is out of harmony with a commercial people is with regard to the advice which comes so natural from a lawyer to deal with an opponent in private, the object being to convey ideas which are not in harmony with the whole truth, and, if necessary, to give promises to which one will not adhere. How different are their customs from those, for instance, of stockbrokers, who trust each other to make good their promises even if they consist in the mere nod of the head. Of course there are some merchants who act on the principles of the legal profession, and do not consider themselves bound by private conversations and unwritten contracts; but when the rest of the commercial community combine, as they did some years ago in Manchester against a caste which indulged in these sharp practices, such a movement is, at any rate, in harmony with the laws and customs of the land. The un-English nature of lawyers as a body is manifest even in their dress, each barrister's gown being provided with a pocket on the back, into which in past days the fees were placed, in order that he might honestly (*sic.*) say to himself that he had found money, but had not taken payment, it being a tradition that barristers are not the paid servants of their clients, but their patrons, because in former days serfs and menials, who in barristers' eyes are now represented by the general public, could not hope for justice unless their causes were taken up by their chieftains.

One of the worst effects of the presence of a large number of lawyers in legislative assemblies is that new laws, instead of being clear to all who read, are as ambiguous as a lawyer's own testamentary will. Lawyers' brains seem to be so constituted, or so injured in training, that practical men cannot even appreciate the difficulties

they experience in grasping facts and ideas. One may wander from court to court and be treated over and over again to painful attempts of judges, or of counsel for them, to get witnesses to express in very definite words some fact or idea which is perfectly clear to the laymen jury, but not expressible in the form in which it can be entered in a judge's notes. Naturally, such notes, as they are limited to the use of law words, which are doubly limited as regards meaning, do not convey the full idea, and, naturally, laws which have been amended by these men never contain the full meanings of the legislators. "You may know what a Bill means when it is introduced into the House, but you do not know what it means when it passes out," is a common comment on these matters. This ambiguity is not always accidental, for official draughtsmen of Bills have to exercise their ingenuity in designing phrases which shall appear to mean one thing to their own party, another to the opposition, and another to the law courts. Naturally, they chuckle to themselves whenever they have capped this performance by evolving a paragraph of which they scent that it will have to be submitted to a court of appeal for interpretation, for it is sure to bring grist to their outside brethren. Even Cabinet Ministers show by their utterances how oblivious they are to the fact which to ordinary mortals is self evident that it is the height of depravity to pass laws through Parliament of which they publicly state they have been so ambiguously worded that they will have to be interpreted by the law courts.

There are other elements in all legislative chambers which deserve a passing notice. Real statesmen are few. Men who grasp the intricacies of human nature have to be born, not made, and men who study the difficult problems of modern life must have leisure, and must, consequently, be independent, without thoughts about earning money. There are few men in any nation who combine these qualifications, and fewer amongst the legislators. These,

including the lawyers, have probably axes to grind. Many hope for a knighthood, peerage, or a seat on the bench or woolsack. Nearly all, besides posing as creators of new laws, also love to pose as patrons. They love to be besieged by place-hunters. It makes them feel so important. As a rule, too, each member has his own particular financial interest at heart; at any rate, fellow-shareholders and fellow-directors are sure to remind him if the businesses with which he is mixed up, are threatened. There are other more enterprising spirits who use their frequent contact with State officials and Ministers for their own advantage.

The worst class of legislators is probably the salaried one. These legislators cannot be expected to have any other interest at heart than their own and their incomes, which depend on their retaining their seats after each election. It is absurd to expect a large number of men, who every few years are face to face with the prospect of ruin, if not starvation, for whatever other business they had is gone, not to use every means to avert that danger. As in Norway, they may clamour for permanent posts, and if these are not available, may create them: consular and diplomatic berths—which movement has led to disintegration. In other countries paid legislators are more honest, or, at least, straightforward. They work for pay; they, like the Condottieri of Italy, will fight for the man, the combine, or the interest which pays them best. Others, again, who see the prospect or possibility of losing their incomes, labour only to feather their nests in the shortest possible time. However, the really worst effect of paying legislators, no matter whether this be done by the State, combines, trades unions, or foreigners, is that, like some quack doctors who keep their patients in a chronic state of illness, they dare not carry out really effective legislation. Grievances must at all costs be retained or created else their vocation is gone.

State Incongruities: Representation.

As yet England has not got manhood suffrage, and already female suffrage is entering into the domain of practical politics. Suffragettes hope with their voting powers to remove existing incongruities as regards their sex; but they forget, or it does not trouble them, that their presence introduces an incongruity, against which the French Revolution was one of the most drastic protests. It was an incongruity that the interests of the nobility, the clergy, and the community, although all were represented by men, should be in conflict. It will be an infinitely greater incongruity when the conflicting interests of men and women, represented by men and by women, measure swords with each other. The larger state will have a poor time of it until its two sub-states decide which half is to be "the State."

Female suffrage in Finland is as yet not a serious incongruity, for the two sexes are holding together against the terrible prospect of being deprived of all freedom by their aggressive Russian neighbour, but in most other countries the case is different. New Zealand, which is by no means an ideal state, can also indulge in a luxury which would be fatal to a European state. As yet the franchise is claimed only by those women who, by recent legislation on the part of the male sex, have become absolute possessors of property, property being a something which has been created by man, and the essence of which, strange though this may sound to many men when they contemplate thrifty housewives and extravagant mistresses, is not really grasped by women. Why not rather give votes also to mothers of families and withhold votes from both men and women who are not married, or who have not adopted a child or provided for the rearing of one good citizen? By this means one of the prospective possible further incongruities could be avoided, while marriages and large families would be really encouraged, instead of, as now,

being nominally encouraged, and yet practically made most burdensome.

From a timid man's point of view, the sharing of responsibility with one's wife and mother-in-law, as in China, the broadening of the political basis, by giving votes to women, may seem advantageous, but it will be the same in politics as in home life—there cannot be two masters; either men or women will rule; and the struggle between two such important principles, the possible change from men rulers to women rulers, will be such a serious revolution that those men who go so far as to think that women ought to rule should pause and reflect that the change cannot be effected in a lifetime, and that whatever may happen in the future they will not reap its benefits, but only the disadvantages of the transition.

Women have a world of their own creation called Society. It is less exclusive than man's creations, as for instance, the Stock Exchange, because the other sex is admitted into it, but the incongruities and harshnesses of Society's codes of Europe and America are of the most glaring kind, and if inflicted on whole nations, by, say, female Autocrats, would inevitably lead to bloody Revolutions. If, however, voting powers were to be conferred on women there is every probability that female Members of Parliament would soon be elected; these would decide to elect Female Prime Ministers, and as Parliament claims to be omnipotent, there is the prospect of having autocratic female rulers. Many people will say that it would not be a disadvantage in the interests of peace to be ruled by the gentler sex; many others consider that the instinctive feelings of women, even in State affairs are better guides than man's clumsy reason, but a small remnant will review history, and ask what happens when women are absolute rulers.

There have been few Queens of late in their own right, and most of them, like Queen Victoria, have been married and guided by their husbands, at least during the greater

portion of their lives. These cannot be used as examples. It would not be fair to take as examples the many celebrated Mistresses of Kings. Females like Madame de Pompadour were in a sense of the nature of usurpers, and, therefore, exceptionally strong characters. It would also not be fair to take Queens of antiquity and of the Dark Ages, because civilisation was then of a different order from what it is now. Attention however, may reasonably be centred on those absolute Queens who have lived since the Middle Ages, beginning with our own Mary and Elizabeth Tudor. In England these two were followed by Mary wife of William, Anne, and Victoria. Scotland had Mary Stuart. Spain had Isabella of Castile, married to Ferdinand, Maria Anna, and Isabella II. Portugal had Maria I. and Maria II. In France and in many German and Italian States the Salic law excluded women. Russia has had Catherine I., Anna, Elizabeth Petrovna, and Catherine II. (the Great). Sweden had Christina.

Now, of these sixteen Queens our Elizabeth, Mary Stuart, Isabella of Castile, Catherine II., and Christina were exceptionally gifted and highly educated women, of whom Elizabeth, Isabella, and Catherine II. may be classed as great. This compares very favourably with the average King, but elected Kings and Emperors, like those in Poland and Germany, should not be counted, nor such as have attained their positions by force of character. It, therefore, seems fairest, when making a comparison, to take a set of Kings who have ascended their thrones not on account of their qualities, but by the haphazard process of inheritance, as did the above Queens, except Catherine II. This condition is best fulfilled by the English Kings, all of whom, except some Kings during the Wars of the Roses, William I., Stephen, and William III., followed each other according to the arbitrary law of succession. Amongst these thirty Kings there are a few celebrities—Richard I., Edward III., Henry V., Henry VIII.—but none of these obtained the title great;

besides the proportion is only one in seven, whereas amongst the sixteen Queens there were five who could more than compare with the above. Thus far the advantage seems to be with the female sex, and it is increased when it is remembered that Mary Tudor, Mary wife of William, Anne, Victoria, Isabella I. and Catherine I., Maria I. and Maria II. were married during a great part of their respective reigns, so that there are four conspicuous Queens amongst only eight practically independent ones.

Dealing exclusively with these eight, it appears that the great ones were eminent in proportion to their individual abilities of picking out and of relying on great statesmen. The greatest interest, however, centres in their treatment of the sexual question, for which they have been seriously censured by the Urban spirit of the age. Here no attempt will be made to sit in judgment on them, not only because that has not been the method which has been followed throughout these pages, but also because man cannot decide what is right or wrong for women to do, and because as regards this very question neither Kings nor Cabinet Ministers can safely throw stones.

Now, it appears that these eight female autocrats, as far as the tempers of their people would allow them, either openly or secretly held the view that an independent Queen has as much right as any independent King to full sexual liberty, and they acted accordingly. Elizabeth's is a doubtful case, but Mary Stuart, Maria Anna, Anna, Elizabeth Petrovna, Catherine II., Christina, Isabella II. held these views. Of these independent Queens, Elizabeth, Mary Stuart, and Christina, unfortunately for their reputations, as judged by men, were extremely cruel towards past lovers. This may have been due to the necessity which they seem to have felt of not offending their Puritan subjects, who were just in the throes of the Reformation, but to man it seems horrible that a woman like Mary Stuart should have been capable

of inviting Castelard to Scotland, should at one instant have longed for his passionate embrace, and in the next when he was accidentally discovered in her room, should call on her half-brother to slay him, "and let him never speak a word."

Education seems to have had no restraining effects, for Elizabeth, Mary, Catherine II., and Christina had most excellent educations, the two latter corresponding with all the savants of their days; but that did not save Darnley Stuart, Castelard, Rizzio, Paul of Russia, or Monaldeschi. These women had much of the character of Bluebeard, who is quite an exception even amongst mythical men. Catherine II. was more manly, for although she connived at her husband's murder, she treated all her lovers, even after tiring of them, most munificently, it being computed that in the aggregate they received £20,000,000. No wonder that she was called the female Louis XIV. The Bluebeard trait in autocratic women is perhaps a natural one, but, therefore, all the more important. Woman in contrast to Man, is less energetic, more passive, and, therefore, by nature more constant, and a faint echo of this sexual attribute may, in an autocratic woman who has lost it, lead to expect constancy in a past lover and punish him, even with death, for consoling himself with a less majestic sweetheart, or for not dying of grief and disappointment for the loss of a Queen. As showing the nature of some of these Queens, it may be mentioned that Christina, daughter of Gustav Adolf, was crowned King and not Queen of Sweden, and that she gave up State worries because these prevented her from having that full enjoyment out of love which she considered as being due to one born in the purple, and Elizabeth Petrovna objected for a long time to be made Empress of Russia for the same reason that Christina resigned.

Vague, undefined recollections of these cases, supplemented, perhaps, by experiences of what some women

will do, even though controlled by harsh rules of Society, their own particular creation, make men pause before they will assist at giving to women powers with which they may be able to defy social codes or to reverse them. European behaviours were not fixed by one man, as by Confucius in China, when he established 3,000 rules, nor are our codes 5,000 years old. If, however, one set of codes could spring into existence in about five years, as it did under Louis XIV., there is no reason why present social views should not again undergo an equally rapid change. It must be remembered that the demand for female suffrage has grown out of the permission granted to women to hold independent property and to earn their own livelihood, and that a very large majority now stand in relation to their poorer sisters as any one of the above-mentioned Queens stood in relation to the whole lot of their female subjects, who in those days could hold no property except through male guardians, who would naturally exert a considerable controlling influence. Besides, these Queens, through their learning, wealth, and power, were as emancipated as any female suffragist of to-day could claim to be.

The female suffrage question will not, of course, be settled by recalling the doings of a few autocratic women. Humanity is more likely to be swayed either one way by a bold statement about the superlative advantages of female politicians, or the other way by a vague feeling that in spite of many similarities between men and women there are even greater differences. The advantages which women bring into the field are that their instincts act more rapidly than man's slow reasoning power, and that the conclusions they jump to are often, but not always, the best. This places women on a level with the greatest of men of the world and with geniuses, for their brilliant ideas have been of the nature of instinctive inspiration. Then also women look almost exclusively to the objects which they desire and do not trouble them-

selves about the nature of the means for attaining them. Herein again women rise to the level of great men, for the ordinary male is so much given to thinking about the means, that he often forgets the end to be attained. Against these favourable qualities many disadvantages might be enumerated but these will appear on making an examination of the leading differences between men and women.

In trying to enumerate these, the difficulty of enormous overlappings is encountered. Men are taller than women or rather their heads and limbs are as a rule quite 20 per cent. larger, the trunks being about equal, and yet *some* women are very much taller than the average man and *some* men are very much smaller than the average woman. Men are more mathematical than women and yet there are some women who understand quaternions which are comprehended by very few men; men are also stronger than women and more sensitive, and yet there are some very strong and some very sensitive women. This overlapping difficulty is to a certain extent removed if those who wish to form an impartial judgment will confine their comparisons to brothers and sisters of single families, and they will receive considerable assistance if they keep in mind the two following generalisations. The one is that women are the worshippers of matter and its attributes, such as possession, whereas man worships energy and its manifestations, and also activity. He is interested rather in the means than in the object. Thus Newton was less proud of the discovery of the law of gravitation than of the means—higher mathematics—which he invented for dissecting his subject. The other generalisation is that many differences between men and women are similar to those differences which exist between European and Oriental men. Should these views appear to be reasonably correct, then it would follow almost naturally that Constitutional Government, which has never succeeded amongst Orientals, is hardly likely to

flourish if it should fall into the hands of female suffragists.

The above principles reveal themselves even where least expected on the mutual ground of love. European men love the labour of courtship, whereas women and Orientals dispense with this preliminary and glory in the possession of their respective husbands or wives. Possibly a thorough appreciation of this difference would make it easier, than it is popularly believed to be, for men and women to understand each other. Of course there are men who are merely proud of their wives, and are then known as the husbands of the beautiful Mrs. M., or the witty Mrs. N., and there are also women who court and capture their victims, but these are exceptions which prove the rule.

A rich woman glories in her possessions and shows them off, and is admired for doing so, whereas a man who does likewise approaches to the Oriental type. Women and Orientals love jewellery, coloured and ornamented dresses, style and ceremony. European men do not wear coloured or conspicuous clothes; many men do not even wear a single ring, and some wear no watch chains. Of course there are men who affect style in everything, who spend hours on their dress, who wear two or three rings, watch chains, and bracelets, but these again are the exception which prove the rule, besides many men do things to win or to please their wives which they would not do if left to themselves. European women and Oriental men readily adopt new names which obliterate those of their ancestors, whereas European men are extremely proud of their surnames and at heart despise those who adopt aliases.

Women and most Orientals are smaller than European men, and adopting the previously mentioned disproportion as regards heads and limbs (the brother of a girl who wears No. 6 gloves, will usually wear about No. 8) it would appear that the relative volumes of these parts are nearly as two to one, which is probably the relationship of the

respective brain capacities and also of the muscular powers. Of course there are women and Orientals with short trunks and large limbs and heads, and there are European men with long trunks and short extremities, but these are exceptions. The European woman and Oriental man mature much earlier than the North European male; his heart beats about 60 times per minute, that of the women and Oriental men beats about 100 to 120 in the same time, showing that there is a marked constitutional difference between the two. European men have relatively hard muscles like dogs and horses and their natural offensive movements are kicking and striking; women and Orientals have the softer cat-like muscle, and prefer to pull when sawing or planing and to scratch when fighting, the bent Turkish scimitar with its sharp inner edge offering a typical illustration. Nevertheless there are hard hitting women and soft muscled men. European men prefer to work standing, while women and Orientals prefer to sit, so much so that labour saving machinery for the East has to allow the workers to sit or squat. Their power is not in their legs. In spite of the smaller body of woman, its network of nerves is a relatively coarse one; this is also said to be the case with Japanese and Chinese men, who can stand inordinate amounts of pain, but here too, there are overlappings and exceptions. European men frequently faint in dentists' chairs and even while being vaccinated. Women are not so weak, and yet in spite of good powers for enduring pain neither women nor Orientals have the European courage with which to face visible danger. Men button their clothes from right to left, women and some Orientals button theirs from left to right. European men count amongst their number some good mathematicians; there are absolutely none amongst women and Orientals, but there are certainly many unmathematical men. European men are inventive, women and Orientals are distinctly non-inventive, unfortunately there are also

many helpless European men. Men love to argue, they love to polish their weapons and their mathematics and speeches; they practise fencing and other arts, and worship activity of every sort. Women have no love for these doings. Those who have used weapons did not care what they were like and if any women have mastered mathematics it was for an object. It is the object which women and Orientals worship, and not the labour and means for its attainment. The one point wherein women surpass both European and Oriental men is in their being able to dance on tip-toe.

Many more subjects in which women and Orientals resemble each other in differing from European men might be mentioned, but the above list must suffice, for it will be found that even with this limited number the overlappings between men and women introduce complications which can only be touched upon here but not unravelled. The keynote for all these difficulties is that there are even amongst Europeans both unmanly and effeminate men and unwomanly and manly women. Thus the mere mention of the experience that women have the object in view and do not consider the nature of the means which have to be employed, at once conjures up the remembrance of the principle which is said to guide the members of the Society of Jesu. Cæsar and Napoleon too were men, yet they never hesitated to employ means which other men would not think of, and they broke their words as readily as if man had never invented his code on this subject. It cannot be said that the Jesuits, Cæsar, or Napoleon were effeminate men, but they were certainly not typical European men and differed from those amongst whom they lived in more respects than one. Certainly none of these men would be desirable additions to our Councils. They might, however, have stepped into the places of Queen Elizabeth, or Catherine the Great, without creating any material change.

It has been mentioned above that women are not

inventive; and this can easily be confirmed by consulting the patent records, when it will be found that over 20,000 patents are annually taken out by men but none by women. Then also, either because women of all ages and of all times have been content to do the drudgery work, or because they have not been inventive, they have dug and harvested, they have ground corn, baked and cooked, they have spun and woven clothes, etc., generally for no payment, and yet they have never tried to ease their hard lot by inventing the plough, the reaping machine, the millstone and flour roller, the spinning wheel and loom, nor have they been at all instrumental in applying mechanical power to these labour saving devices; on the contrary, no sooner is a new invention established with which one man can do the work of twenty, than women step in and condemn themselves to the drugery of factory life.

Now if women during 7,000 years of civilised life have never invented, it may be taken for granted that they cannot originate ideas. It is true that there are also many men who cannot originate, but there are generally a few in our large and small councils who, when face to face with any new difficulty, can devise expedients for meeting it without having to fall back on precedents, which is practically all that women would do. Each assembly has a Secretary and other officials who take the place of women and whose duty it is to know the past; and there are lawyers who also deal with precedents, but these men are not expected to decide questions, even though they may have sufficient originality to invent expedients. If, as most people have found, lawyers are undesirable on deliberating bodies, possibly because they cannot originate, then the same remarks can with equal truth be made about women. They frequently prove to be excellent officials but bad administrators. Of course there are men entirely deficient in administrative faculties, who may feel inclined to admire as superiors those women who are perhaps only their equals in this respect.

Another disadvantage which women possess is that they do not seem to know the meaning of the word compromise, with the result that if they have once supported any particular policy, they will not give it up even if defeated. There are men of the same stamp, but as everybody knows they are a great hindrance to smooth working in councils and politics, for not only do they differ from the average men, by whom they are never fully understood, but the majority has constantly to be on its guard against sudden resurrections of questions which have been definitely decided. When once a question has been settled, a council should not have to reaffirm over and over again that it will not move in the opposite direction, its duty is to deal with the new difficulties which crop up. Most women and some men, however, would use every difficulty which it would be meritorious to overcome, as a peg on which to hang the remark: "I told you so." With such companions in arms progress is slow and unsatisfactory. They see the badness of the road which they are treading, and imagine every distant boulder-strewn mountain path to be perfection in comparison.

There is yet another factor bearing on the question of female aptitude for political life, which is of importance because to a certain extent it masks many of the sex differences mentioned above. It is well known that deficiences in one or the other function of the human body throw an excessive amount of energy into other functions. The deaf are said to increase their seeing power, blindness is often accompanied by increased hearing power, a sluggish liver increases the activity of the kidneys and *vice versa*, and even in the serious case of consumption, the inability of the lungs to use up a due proportion of the energy in the blood, creates the well known buoyancy of spirits of consumptive patients. This effect would appear to be intensely strong when the chief manly and womanly functions are either naturally dormant or absent, or have been crippled by desuetude. In such cases there

seems always to be a tendency for the sex differences to be bridged over. In other words, unmanly men grow to be effeminate in intellect and character and unwomanly women grow to be manly in these respects. Generally, too, in these cases the power which is not used up, as in ordinary persons, makes itself felt as superabundant and often meddlesome energy. Charles XII, who was so unmanly as to hate the sight of a woman, ruined his country by his restless superabundant energy; Napoleon seems never to have been in love; he proposed marriage merely to those females who he hoped might help him on a step or two, and his few miserable love affairs seem to have been indulged in more for the sake of complying with the fashion of the day than because of any inclination on his part. Related experiences are to be met with in all walks of life, but chiefly amongst those who either by inclination or necessity overstrain one of their functions and thereby cripple others. Scientists are a good example, and those amongst them who concentrate all their energies on thinking processes, seem to become unmanly and to develop womanly traits of which jealousy is often the most conspicuous. Newton is a case in point, for when Leibnitz had forestalled him by three years in publishing his differential and integral calculus notation, and when the Royal Society appointed a Committee to enquire whether Newton had not devised his system of fluxions several years previously, it was, as now appears, Newton himself who in his own handwriting drew up the report for the Committee in which it was asserted that he had been the first in the field. Not only does this event reveal an extraordinary amount of jealousy, a very womanly characteristic, but also a tendency to employ any means even unworthy ones, which will lead to the attainment of an object. This additional womanly attribute was certainly not missing in Napoleon, and has been adopted as a fixed policy by a large section of the Church of Rome, amongst whose guiding spirits

there are many who are truthful when they profess to have no manly sexual longing.

If this view be correct then the reverse condition should also exist, namely that of individuals becoming unmanly or unwomanly if they overwork any of their bodily functions. Men like Newton with his devotion to science, and Napoleon with his devotion to battles should appear less manly than their brothers, and women who by natural inclination or necessity direct all their energy into some special groove, whether in art, science, or manly occupations, should appear less womanly than their sisters. Of the many historical examples which could be cited, the Grande Mademoiselle must suffice. As a girl she commanded armies and won victories during the Fronde, and almost naturally never inspired sufficient admiration to be courted.

The Roman Catholic Church seems to have been the only power which has attempted to deal with restless manly women and effeminate men, the plan adopted being to let them do hard but congenial work in nunneries and monasteries. Unfortunately the problem was not fully grasped, and the abuses which crept into the system condemned the experiment. The modern idea of awarding classical fellowships to men, and encouraging women to do manly work rather intensifies the evil by increasing the number of men and women who have a deficiency of natural instincts. This may account for the experience that many women not only have no motherly love for their children, but even hate them, so much so that a society for the prevention of cruelty to children has had to be formed and finds only too much work to do.

The average woman looks on the athletic, learned and other unwomanly women as being of the nature of working bees in the human beehive, and almost naturally objects that suffragettes, who belong to this class, should in the outside world wish to represent the Queen-Bee who stays at home. There are real men and women and

unreal ones. Real men have built up the modern state and formed the idea of property. Real women have created our modern homes and have founded modern Society; they do not grasp the essence of property and state and leave this to the men who are already heavily hampered by unmanly men of whom some belong to parasitical castes and take advantage of the state laws for their own protection, but will not bear arms even in defence of these advantages, while others belong to the thriftless who are unable to grasp the idea of property. Does it not seem unreasonable that another caste or unsexual sex, which also will not bear arms, which also does not grasp the property idea, and which will not even marry and make comfortable homes should be allowed to meddle with man's creation. They have their own invention, the substate called Society, at which they could labour to their heart's content, for their is plenty of scope there for their superfluous energy, but that does not attract them because it is not manly, or perhaps they are practically outcasts from the Societies of their respective circles, because they will not conform strictly to rules and regulations which to men certainly seem incongruous. If that be so, then it is easy to understand why they should wish to join the male circle, but that is no reason why men should allow themselves to be dominated by unwomanly women, who, to judge by their behaviour in councils, would certainly at once set about converting the national state into a narrow-minded and harsh machine after the model of Society. Queen Elizabeth suited her times and shone by contrast with Mary and James I, but she would not have been welcome in any modern deliberative assembly; besides she, like all women, leaned for inspiration on one or more men in the background. Even Catherine the Great had her Potemkin. Herein lies perhaps the main reason why Societies, on whose Councils women are allowed to sit, always come to grief. The female element on these Councils is invariably dominated

by one or two men, possibly outsiders, and an unequal struggle has to be maintained between a body of men and an invisible antagonist. If no men are present on the Council two female camps, each under the influence of some outside male, struggle with each other, as did the ancient Greek townlets under the influence of the invisible patron gods.

State Incongruities: Constitutions.

In spite of these objections to allowing women to join in the deliberation of state affairs either as electors or as would soon result, as members, there is the larger question of the general incongruity of practically all representative systems. The saying that the state ideal should be "The greater average happiness of the multitude," leading as it does to the demand to crucify some one, seems contrary to beneficial state progress and might with advantage be replaced by the old English ideal of equality, which if expressed in the above language would be, "the greatest average happiness of the individual." In order to attain this happiness each individual man, woman, or child should be permitted to express its unhappiness. This means universal suffrage, and would give to the man who has a large family a corresponding number of votes. Unfortunately the happiness of the individuals of a state depends on external enemies; in fact the state idea has grown out of the necessity of being able to ward off outside attacks, and unfortunately, too, multitudes have always proved themselves both unable to see approaching dangers and to invent the means for combating them, and advice on these matters, to be effective, has always had to be sought from men who were in touch with the outside world and who had substantial and permanent interests at stake. The natural tendency will, therefore, always be to look towards landed proprietors for state guidance. Then there is the inter-

mediate interest, that of the workers. Their interest in the country is great, but under modern conditions it is often cosmopolitan and generally it can be transferred from one country to another. There is the farm labourer and the mechanic who can emigrate, the merchant whose interests are not always in harmony with the happiness of the state, and the plutocrat who can at a very short notice transfer himself and his property into other lands. This combination of interests is a very important factor in all modern states, for in contradistinction to the happiness of the individual it represents the property idea and should naturally also have an influence in deliberations of state.

In practice this triple combination idea is not easily attained and yet it is the root of both constitutional and other states. In England things are very much mixed. The House of Commons certainly represents the interests of the merchants, manufacturers, and labourers, and its members try to pose as looking after the happiness of women and children as well, but when it is remembered how many ameliorating movements against the harshnesses and negligences of manufacturers have been supported if not initiated by Prince Albert, Queen Victoria, and the King and Royal Family, it is almost true to say that the happiness of the individual has been championed rather by the Crown than by the Commons. The general state policy would thus naturally fall to the House of Lords, as it falls to the Senate in America, but the House of Commons representing the money making classes, holds the purse strings and dictates policies which have for their object, neither the greatness of the state, nor the happiness of the individual, but the richness of a class. A more perfect and yet imperfect compliance with the three chamber idea is found in Oligarchies, and attention is quite naturally directed towards the Italian states where this form of Government flourished. There, too, as might be expected, the three interests often got mixed, or one interest interfered with others, but seeing that

Rome, and the Roman Catholic Church were the most lasting states which have ever existed in Europe, this form of Government deserves attention.

In Rome, a single caste, the Patricians, was entrusted with the general guidance of the state. Continuity of policy was maintained by the largeness of the ruling caste, and the ease with which it seemed to supply the very ablest of statesmen, just as in the days when we muddled through great national dangers, it was the great Whig Oligarchy which produced men who in the nick of time put things right. One shudders to think of the type of saviour which our editors, lawyers, and labour members will put forward in the hour of need. The Patrician caste was either naturally inclined to do its best for the larger state or the flexibility of the constitutional conditions were such that theirs was the best policy.

The position of a governing caste is necessarily one of superiority; it knows better than any other section of the community what is best for the whole state, and though it listens to outside opinions and wishes, it mercilessly represses all attempts at dictation. Herein lies the essential difference between Oligarchies and Plebiscites or Parliamentarily governed people, amongst whom the idea seems to prevail that everybody knows everybody's business better than his own, and where every encouragement is given to the temporary success of new fads.

Autocratic Monarchies, another form of Government, are scarce except in name, and are generally confounded with Bureaucracies. Only revolutionary monarchs are autocrats. Such men upset an old system, the new one is their own creation, their servant. They are master autocrats like Cæsar, Peter the Great, Cromwell, Napoleon, etc. Every autocratic successor is not the master but the servant of the new system, and the system is generally a state consisting of a royal family and a bureaucracy. The head of the family, the King or Emperor, may feel, as does the ruling caste in an oligarchy, that he is "the

State," and that he will gain if his subjects, the greater state, are thriving and contented or otherwise happy, but if he attempts to make changes and improvements, he will at once be made to understand that he is only part of "the State," that not he, but his relatives and officials are "the State," and reforms must benefit them or no one. Even Napoleon was not an absolute autocrat for long, his grasping relations driving him into many unreasonable acts.

The general condition of an autocratic state is one presided over by a family, with a nominally autocratic ruler as figure head, and a host of officials who act as intermediaries to the people. Herein lies one of the chief incongruities of absolute monarchies. Nominally the ruler is the father of his people and bound to hear complaints even from individuals, whereas Presidents of Republics should learn the will of the people only through the polling booths. In practice, however, no absolute monarch is allowed to hear any complaints. Etiquette has even arranged that inferiors shall speak to superiors only on subjects which the latter select, and generally only through third persons. Even an Ambassador, when not acting as the representative of his country, would expose himself to well merited snubs if he were so far to forget himself as to disturb, say a mere Archduke, by speaking to him about any subject with which his own state has no concern.

Although, therefore, the natural tendency in an absolute monarchy may be for the supreme ruler to wish for representative consultative bodies which could inform him of the sufferings and desires of his people, the practical tendency is the suppression of all intercourse between the Monarch and his people except through "the State," *i.e.*, the Royal Family, the Bureaucracy, and the Legislature.

The English Monarchs have for centuries been singularly fortunate in not having been surrounded by near relatives, and with them representative institutions

have always flourished. Although by no means the richest monarchs, English Kings have been envied by others on account of the high credit which they enjoyed in the money market, and as it grew more and more apparent that this favourable position was due to Parliamentary control of the purse, nearly all European rulers have, at least in name, instituted national assemblies. Whether Parliaments are possible, as seems to have been thought, in Mohammedan countries has yet to be seen. The life principles of their peoples are so different from ours that it is difficult to say what will happen when people whose emotions are swayed by promises of a tangible nature in a future life are asked to ignore these and to deal only with the realities of this life. Besides nations which possess an unalterable divine law on all subjects, cannot possibly utilise legislative assemblies as we do.

A fatherly Government suffers from the further incongruity that the monarch is nowadays ruler of a tract of land, not of a tribe, he is powerless to protect those who leave home, and he thinks himself justified in expelling those with whom he is displeased. Under a truly fatherly Government the conditions would be reversed, as was the case during the time of the Roman Empire. A Roman carried his State with him wherever he went. At one time, too, each Englishman carried his country with him, and does so still in savage countries. This form of paternal Government is old and was more easily worked when there was no property in land, when the boundaries of states were not definitely fixed and when all subjects of one state were of a single religion. The conditions then were similar to those now existing in the Turkish Empire in which Turks, Bulgarians, Serbs, Armenians, Jews, etc., are intermixed but form independent states, guided by independent authorities, which may or may not reside inside or outside the Empire. The Roman Catholic Church was a state of this kind, but since the various nations have been consolidated into territorial states, the

dogma that the Pope is the father of his flock exists only in name. Nevertheless there is a strong tendency amongst ambitious statesmen to press this view when it can be used as an excuse for conquest; no sooner however has that object been attained than the principle is at once repudiated, for no interference is tolerated by powerful states from outside ones, although some of their subjects may have been absorbed.

Little need be said about Bureaucratic states, for these are possible under all forms of Government. It is practically militarism extended to the whole public. England and America are suffering from it almost as much as Germany and Russia, except that as our Civil servants have not passed through military drill, their methods are less drastic than those of Continental Bureaucrats. Besides, England has no very costly ambitions, and its Civil servants are so well paid that they are not driven to abuse their positions. The unfortunate tendency with all Bureaucracies is that looking on themselves as "the State" and being thoroughly organised, the rest of the people, the true State, is ground down as much as possible. The first move in this direction is the setting up of Courts of Justice, whose servants are controlled by a chief, and whose judgments, therefore, are not impartial. In England, the first move in this direction was made when the income tax commissioners were established. There is no appeal from them, and the Star Chamber principle is now being extended by the Treasury to other branches.

State Incongruities: Justice.

The various systems of justice all over the world are so full of incongruities that it is hardly necessary to mention them, but it is not without interest to trace the growth of modern institutions. About the time of the decay of Rome, Roman law, which had developed together with its civilisation, came into conflict with Germanic customs,

which were not based on any very decided view about property. Theodor the Great complained bitterly that his Goths, although good men and excellent warriors, would not conform to the Roman laws. Gradually, as the property idea decayed for want of money, as each man took and held what he could, even the semblance of the old Roman justice disappeared. It was against this chaotic condition that German Emperors struggled in vain almost up to the days of Napoleon. Over and over again endeavours were made to devise some system of state justice, but these were opposed tooth and nail by the entire nobility from the very justifiable fear that their autocracy, their liberty to have power of life and death over their serfs and others, who were not so well armed as they, would be taken away. Occasionally Courts of Justice were established, mostly to deal with disputes amongst the lower class, but a national police and public prosecutors could not be brought into existence. There was a better system in England, but it is not so very long ago that the state did not undertake prosecutions for murder until twelve months had elapsed after the crime, in order, so it seems, that the relatives of the murdered might deal with the matter. This gives a faint reminder of what the conditions of justice once were. Even now the English state favours private prosecutions in criminal cases although both police and public prosecutor are paid for by the people. This subject will be referred to shortly.

The absence of national systems of justice on the Continent during the past led to the formation of sub-states having their own codes, and when these were found to be beneficial, they were sometimes sanctioned and even encouraged by the larger states, and led to a diversity of rules, codes, and laws, which still tend towards the dismemberment of all European states. Cities, and especially the Commercial cities of the Hanseatic League were amongst the first to have their own judicial systems, and

these were generally confirmed by the ruler of the district and were looked upon as being highly prized privileges. Each guild in each city laboured hard to be allowed to have its own laws. When they came into existence, Universities had their own laws and their own police. Nevertheless, outside of these centres, there was fearful lawlessness. This was felt both by the Catholic Church and by the general public. The one invented the Inquisition, the other the dreaded Vehm-Gericht, both secret organisations which heard evidence, pronounced judgments, and carried out capital punishments on the high and low, the rich and poor. England, with its then relatively better system of justice was hardly troubled in this respect, but Germany, France, Spain, and especially Italy, suffered seriously and for long.

Gradually these heterogeneous systems of justice consolidated into the present incongruous systems. Napoleon tried to introduce uniformity and the survival of his code to the present day testifies to its worth. But even that code, like the laws of other countries, contains remnants of judicial ideas which have survived from remotest times and distant Eastern countries and these came into conflict with other ideas and conditions of things to which they did not apply. The process is still going on and every now and then these antiquated laws are applied to cases which have grown, say, out of modern invention. In such cases it would be reasonable to suppose that Judges should apply for guidance to the legislative chambers who created the laws, but it seems that to have a matter made clear would be against the interests of the legal profession. It has therefore become a firmly established rule, that when a law does not fit altered circumstances or when a law is found to be incomprehensible, a series of sophistical arguments have to be indulged in, and generally the most complicated explanations of what cannot be explained is given by a Court of Appeal as being the correct meaning of the law with regard to a matter which did not exist at

the time when the law was enacted. There is the well known Court of Appeal pronouncement that "for the purpose of this act a cow is a horse," and it is probably a mere accident that the old highway law against the wearing of masks on roads has not been used against motorists. It is strange that no lawyer has as yet discovered that for the purpose of the act a motor car is a horse.

There are many things with which the written law does not concern itself, such as common law, precedents, customs of the trade, professions, etc. These are often in conflict with each other and are the cause of wonderful incongruities.

A further and most glaring incongruity is the tradition that litigants may not plead in the high courts; they are also supposed not to be ignorant of the law, yet lawyers are expected to drive a coach and four through any enactment, and judges are allowed to confess themselves ignorant of the laws which they administer unless these are pointed out to them. They may in ignorance or intentionally give judgments which the higher courts, to whom, however, the law has also to be explained, have no hesitation in reversing. It was different in the Kingdom of Peru under the Incas. A Judge who gave a wrong judgment was punished as a schoolboy is punished who does not know his lessons. This very glaring incongruity could perhaps be somewhat reduced if reversals of judgment were paid for, not necessarily by the blundering Judge, but by the State which appoints the judges. Such a practice might also lead to laws being more clearly drafted, for if successful appeals from judgments were to reflect on the capabilities of the judges who give them, they would soon insist on clearer definitions from Parliament.

It is generally asserted that the only thing which keeps down litigation is its cost, and that the law suits which are now entered into are numerous because they are not

as expensive as they might be made. The truth, however, is that the law and its application are so uncertain that doubtful and fraudulent cases have good chances of succeeding. In other words, the Judicial system is not one of *justice* but of *chance*. If the public could rely on absolute justice being meted out, litigation would almost disappear, just as crime is diminished, not in proportion to the severity of occasional punishments, but in proportion to the high percentage of detection and conviction, in proportion to the increased certainty of justice being meted out.

With over a hundred and sixty lawyers in the House of Commons, with Judges who profess ignorance of the law, of every day occurrences, of technical matters and sometimes of arithmetic, and with the prevailing idea that litigation should be kept down by heavy expenses, it is no wonder that the legal profession should be invaded by a money-making caste, and that it should be considered honourable for lawyers to accept refreshers, etc., and then not even to appear in Court in their client's favour. In a substate where such a code of honour exists there must be something rotten, and if the boast be true that the English system of justice is the best, other countries ought to be pitied. These incongruities explain to a certain extent why it is necessary to blindfold Justice, who, if she were but free to look about would give her services impartially and insist that she should be approached and worshipped by the multitude without costly sacrifices for the benefit of her priests, the lawyers.

The basis of most European laws is that of the Romans, but how different has been their process of building up from ours. The Prætor, who held office only for one year at a time, was elected to his post on the strength of his manifesto, displayed on white boards, as to how he proposed to judge. These bye-laws might, or might not, be repeated by his successor, but if accepted during many successive years they were gradually assimiliated to the more per-

manent code. Probably the fundamental or divine laws of Rome had grown in the same manner. Practically, therefore, the Roman law has been evolved out of the Common law and custom of trades, but codified under the editorship of practising judges. The edicts of the Emperors were of the same nature. When new conditions had arisen and certain practices had become general, these were adopted by the Emperors.

In constitutional states the making of laws is a particularly exciting pastime of irresponsible faddists, and the carrying out of these laws is sometimes entirely and even intentionally omitted by the State. Probably not one per cent. of the miles of laws are enforced by the Administration. Ireland is a particularly glaring incongruity in this respect, for there the law could deal with crime but for political reasons it is not put in motion.

In order to illustrate the unnecessary complication of laws, let us take the case of such a non-political subject as motor cars. Years ago when steam was first used, legislators enacted laws which in France, Germany, and Austria seriously hampered industrial progress. Even English legislators insisted on a red flag being carried in front of a road locomotive. The time at last came when it was thought safe to remove the red flag, and this was done, but it could not be expected that over a hundred legally trained legislators would be content to follow Canada's example and do such a simple piece of useful work. They first of all divided power vehicles into light and heavy road "locomotives"—why this word should have been used is a mystery—they insisted on a speed limit and on a bell or horn and on sidelights as in ships. The result is that motor cars have become the nuisance and the terror which they are to all non-motorists, and nerve shatterers to their drivers. Is it not incongruous that there should be a law in force on the Thames which prohibits steamers from sounding their sirens, though they are at least half a mile distant from any houses, whereas motor cars may toot in

Gravesend and Greenhithe as if they wished to emulate the doings of the Israelites before Jericho? No one seems courageous enough to deal with the noise nuisance, not even in Scotland where whistling is forbidden on Sundays, because the motoring magistrates have decided to read into the Light Locomotives Acts that all non-motorists must get out of the way when they hear the blast of a horn. They think that horns must be blown, and the louder the better. This is almost as bad as the Cologne regulation of 1905 printed, strangely enough, on the tram tickets, that pedestrians *must at once jump* on to the footpaths whenever they hear a tram bell. There is nothing in the existing Light Locomotives Acts that can be said to demand a louder warning than a tinkling bell sounded continuously, as is used with indiarubber tyred "hansoms," but the act has been so vaguely worded that it was possible for the legal profession to assume that it was intended that motor cars should toot when passing or running down unsuspecting pedestrians, and magistrates have read into the acts that non-motorists, when moving on a road must not look ahead to see that they do no damage, but behind them so as to not to be run down. To do this effectively people should be provided like scorpions with rings of eyes around their heads. Nobody takes notice of the established fact that a single blast of a horn cannot be located, though everybody will have experienced the puzzling sensation of imagining that a sound which he heard behind really emanates from a car in front of him.

If there were no special law on this point, as is the case in Canada, motor cars would have adopted bells for their own convenience, local authorities would have striven to keep down the street noises, and motorists would have had to drive proportionately more carefully, for the common law forbids reckless driving; but legislators seem to to have been anxious to introduce something about which disputes would be endless, and fixed on an arbitrary speed

limit which is too high in towns and too low in the country.

The superabundance of laws leads to a tendency not to administer them and this is resulting in a condition similar to, but not quite as bad as, that which prevailed in the Middle Ages, when numerous sub-states came into existence who lived according to self-made laws, or who forced their views of justice on others. There is a strong tendency nowadays towards the formation of societies who undertake what the police and public authorities omit to do. The press is one agency which claims the privilege of being a quasi public prosecutor with power to libel individuals for the benefit of the state in general, and because this view leads to complications, judges encourage it. Cases of incendiarism and insurance frauds are rarely taken in hand by the state and prosecutions in these serious matters are left to the Insurance Companies. There are unions and leagues innumerable for taking legal actions which the police and public prosecutors refuse to touch. This is a glaring incongruity and sounds as if there were something rotten in the state whose administrators refuse to administer the law.

Private individuals and not the police are frequently found as prosecutors in criminal cases. This is brought about as follows. Supposing that a clerk has been discovered to have stolen money; then the police inspector is made acquainted with the facts, and while the employer is in a fever of excitement he is blandly asked whether he wishes to prosecute. "Of course," is his reply. The case is now prepared by the police regardless of expense to the employer who, having consented, cannot now withdraw from the prosecution; and adding insult to injury, not only may the thief use the stolen money for his defence, but if it be found on him and even if the police prosecute, it is devoted to the payment of solicitors and witnesses for the defence. Generally, too, the criminal prosecutor is debarred from resorting to civil actions for the recovery of his property. Few people care to go

through this experience a second time, few dare come to an arrangement with the thief or with his relatives, for this would be conniving at a felony and punishable with imprisonment. Some satisfaction may, however, be obtained, if, when the police inspector refuses to take upon himself the criminal prosecution, he is reminded that as he is in possession of the facts, he will be conniving at a felony if he allows the thief to escape. But prosecutions undertaken on the strength of such threats are always of the tamest nature.

Similar incongruous conditions exist with regard to cases of perjury. These have nearly always to be undertaken by private individuals and few people care to spend time and money on a matter which concerns the state, but about which the state does not wish to be concerned. Surely when the public pays for its system of justice, it may expect that justice to be carried out sensibly. How is it that magistrates, justices and judges hardly ever report cases of perjury? They certainly are reported by inexperienced juniors of the bench, who, however, are quickly given to understand that this meddlesomeness is not liked in high quarters, and that it may injuriously affect promotion. This might almost be expected, for if there were no false swearing, it would be almost as bad for lawyers, as if the law were quite intelligible and efficiently administered. There would be little left for them to do in some of the courts.

State Incongruities: Administration.

The administrative departments of states are as full of incongruities as anything connected with the law, and it would be wearisome to go through each one; the navy, the army, the post office, tax collection, education, churches, etc. Everywhere the same incongruity is encountered, that the servants of the state are attracted into the respective services by prospects of enrichment, or at least competence, and that a host of devices have to be

adopted against individualism, which in thoroughly bureaucratic states, shrinks neither from bribery, corruption nor from oppression and crime. Having once entered a government department, a man finds his future so definitely mapped out for him, regardless of merits or incapacity, that all desire for improvement is killed. It is well known that the government services in all countries are thoroughly uncommercial, the labour is light and consists to a very small extent of the business in hand, while the greater part of the time of officials is spent in checking each other and in guarding against fault being found with their own work, while neither time nor efficiency are objectives. The system can be illustrated by the military services. Years ago heavy abuses were believed to exist in these departments, and Gladstone saddled them with a host of civil servants who have to do all the accounting and writing. This in itself is a serious incongruity, for in case of war the civilians stay at home, while the officers, who at present are not trained to this kind of work, have to deal with a class of contractors, who to put it mildly, are of the shrewdest. The result, as was shown in the South African war, is that many millions are often wasted. But even in times of peace the system is most incongruous, for the officers who should be looking after the technical side of every transaction, have to delegate this work to subordinates and have to devote their time largely to dealing with, or rather checkmating, the civil servants, so that doubtless these latter and an equal number of military men, who do nothing else but watch each other, might be dispensed with and the service improved.

If people, who in times of peace are brought up on these incongruous lines, have suddenly in times of war to devise a sensible system, they are hardly to be blamed if they do not always succeed, for it is an incongruity in any War Office to work on lines which in time of war do not at once adapt themselves to the altered circumstances;

even ducks' feet, which are quite suitable for walking on dry land, can, at a moment's notice, be used as propellers without having to be re-modelled for each emergency like our military establishment.

Is it to be wondered at that, with the prospect of disorganising such a system by attempts at reform most men will think long and often before they raise any question which cannot be settled according to precedent, and why the supervision over supplies, is as bad as it is? There are hosts of merchants who absolutely refuse to supply any government departments, for they know that they will be put into competition with men who do not hesitate to take full advantage of what might be termed laxities. Additional supervision of the supervisors would be of little avail, but would add to the expense and increase the tangle of red tape. The more simple remedy, according to which heads of department should on occasion investigate matters for themselves, is by tradition considered to be beneath their dignity. Yet if a commanding general were but once to break through the programme of his reception, and were to insist on having a truss of hay opened out, oats sampled and weighed, food and clothes examined in his presence, etc., he would find it unnecessary to do so again for the rest of his natural days. Even if he did not find bad quality and short weight, he would set an example to those under him which would spread to those immediately responsible and would teach them to look after things themselves. That is probably the only way in which the incubus of civil servants can be made to disappear from the army. At present responsible men do not know what is going on, and the supervising civil servants do not know what things are.

State Incongruities: Taxation.

A nation's money affairs, its taxing system, debts, assets, including mineral and land value, trade influences, etc., are full of incongruities, and quite naturally so for all

European states came into existence after the disruption of the Roman Empire and the disappearance of money and the property idea. Since then money has returned and the property idea has developed new marvels: paper credits, limited liability companies, etc. No wonder that when these are mixed up with ideas, which have in the meantime been created, everything is found to be at cross purposes and no wonder that with a host of busy body constitution-mongers no finality seems to be attainable.

There must be a limit to the taxing capabilities of a people, but political economists have not yet determined what it is in modern states. In Peru under the Incas two thirds of the workers' earnings went to the state, for two-thirds of the population which might be called either bureaucrats of aristocrats, priests and officials watched over the remaining third and kept it at work. No information seems available as to what portion of the Egyptian and Babylonian population did productive work, but as these districts were quite as fruitful as Peru, and as the farming industry was well regulated, it is probable that the ratio of workers to idlers was even smaller. Certainly there must have been a very large number of non-productive workers who built the Pyramids and Temples, and these had, of course, to be fed by the real workers.

In the less fertile Northern districts the ratio of producers to non-producers has always been large. In feudal times it may have taken five tillers of the soil to keep alive themselves and one priest or soldier, but with returning civilisation this proportion has been steadily reduced, and now it is probably not far from the truth to say that there is an approximate equality of numbers as regards producers and non-producers, of farmers and artisans on the one side and leisured classes, state officials, railwaymen and sailors, merchants, lawyers, etc., on the other. A strict comparison is, however, impossible, for although it is fair to class artisans as producers, for their wares are exchanged for foods and other commodities

necessary for life, there are many inhabitants of foreign countries who labour for investors and count as our labourers, while some of our weavers and spinners labour for distant savages and are in a sense their servants.

It is a convenience, if not a truth, to suppose that producers provide the surplus on which the non-producers live, and that the surplus energy including the energy of the non-producers is available for state purposes. In Peru, possibly, also, in Egypt and Babylon, the whole of this surplus energy was used, perhaps wastefully, by the government. In modern states the tendency is rather for sub-states to avail themselves of the surplus for the purpose of furthering their own interests even at the expense of the larger state, and it will probably remain a moot point whether this condition, which is very prevalent in England, her colonies and other new states, is better or worse than that of the Continental states where the governments strain every device to capture as much surplus energy as they can for the state as a whole.

In such states it is evidently the most rational proceeding to encourage productive labour, and Germany has certainly set an example as to what can be done. Not only has every male, from the age of 20, when his expectation to live to 65 years is about 35 years, to devote altogether about three years, or nearly ten per cent. of his working life to soldiering, but another twenty per cent. or more is constantly being deducted from production in the shape of duties and taxation. Almost every taxing device has been tested to breaking point, or up to the taxing limit of a people, for when a change has been made nothing has usually been gained except the unwelcome lesson that the taxation of a nation is limited, no matter how the taxes are adjusted.

A bad feature of the taxing arrangements in nearly all countries is that in order to find berths for a pertinacious host of applicants, who either directly or indirectly have done good services at elections, a number of civil service

posts have to be created which are not needed, and it would certainly be a relief to parliamentary candidates and a benefit to the state if canvassers and subscribers were by law disqualified from obtaining Government employment until after the next following election. It must be remembered that in England political helpers do not get turned out of office if their own side loses, and therefore new berths have to be created for those who were of service in turning out the defeated party. That is why, for instance, instead of merely taxing all incomes, a number of officials are engaged to sell stamps for receipts, bills, conveyances, etc., some attend to the remainder of incomes, others attend to what is saved of income by collecting legacy duties, and yet others deal with the same monies by means of succession duties. Thus there are five lots of income tax collectors doing the work of one. Again with regard to liquor: malt is taxed, so are hops, then the spirit is taxed, then there are licenses for brewing, distilling, wholesale and retail selling, and taxes on turnover, profits and saving. Here ten officials are employed where one would suffice. The chief of any department is never encouraged to suggest a reduction in his staff, and yet it ought to be an advantage to the state to achieve great things with small means. A weeding-out process should effect, with regard to superfluous berths, what the English sinking fund effects with regard to the national debt; both should automatically diminish. The present process is unfortunately similar to that which prevails in most government departments with regard to money grants. When these have been voted, every nerve is strained to spend them, and when a certain establishment has once been created, every nerve is strained to find work for the full number of hands, even to the extent of undoing in one department what has been done in another.

Another illustration is afforded by India. When our constitution-mongers failed with their agrarian nostrums

in Ireland they recently transplanted them to virgin soil in India. At one time the whole of that land practically belonged to the state which was the sole landlord, the total rents comprised rents, rates and taxes of the rural populations. Now this is being altered, proprietary rights in land have been created in India and the surplus earning power of the land is raising up a landlord class and with it an Irish land question. It may be easier to tax a rich landlord at a steady rate than to collect fluctuating rents from small farmers, but at best landlords are expensive intermediaries and by creating this class, the relatively reduced government income has to be supplemented by additional duties, which require double the number of collectors. The state, not the individual, should bear the burden of fluctuations.

Seeing what radical changes can be produced by re-adjustments of taxation, it is naturally not surprising that some people are as anxious for changes as others are opposed to them, and that as this matter is left in the hands of the members of parliament of constitutional states, there is naturally every inducement repeatedly to shift the taxing load. This in itself is a serious state incongruity, but ignorance as to the effects of changes, and unwillingness on the part of the governments to refund to the people a small commission of their taxes in the shape of experimental researches is almost a worse incongruity. For instance, the farming interests have always borne a heavy share of taxation, yet during countless ages few governments have done anything to improve either agriculture or cattle breeding. It is due to private efforts that anything is known about the benefits of rotations of crops, or about certain natural and artificial manures. No state department troubles about the improvement of corn, potatoes, or other root seeds. The study of insects and diseases is left to amateurs, and meteorology, the most

important science to farmers, is practically neglected, at least in England.

Up to the days of Smith the geologist, it was the same with the mining industry. Formerly prospectors were encouraged to trespass on private property and to "dig and delve" provided that they paid a large part of their find to the government. This in itself was a serious incongruity, for the government might have spent a relatively very small percentage of its share of mining incomes both on borings and on metallurgical research and done much to make our mineral wealth available. Instead of this, it finally handed the proprietary rights in the minerals to the occupiers of the surface, hoping that in their own interests they would "dig and delve;" if they found anything worth having they might then be plundered by the tax collector, and now also those who do not dig and unnecessarily waste our precious mineral resources are to be taxed. The result has been a most unsystematic system of coal mining and a persistent ignorance of practical geology of the British Isles. The stratification of coal, as divulged by mines, is kept a dead secret. What little there has been done in this matter was initiated by Smith, an amateur palæontologist and founder of that science, but even now the geological surveys are merely surface scratchings, for the government having practically disowned its mining rights, has never even sunk a single exploring bore hole.

Similar but severer remarks apply to the arts and crafts. Year after year the Patent Office rakes in fees from hard-working inventors, and hands them over to the Treasury to be spent on various services quite unconnected with industries. Until recently not even a search was made as to priority of inventions, nor does the government ever seem to have taken action when its attention was drawn to infringements of its sealed patents by the importation of patented articles. Inventors have been heavily taxed and have had to publish their inventions, but they have

received no government protection or encouragement in return. These various cases reveal a series of serious state incongruities, for the clearly defined and often expressed objective of the state is amongst other things to improve farming, mining and engineering, yet no portion of the vast sums which these sub-states supply is ever spent in helping these interests forward. The only department which is once more found doing its duty in this respect is the navy. No private efforts could have produced the excellent charts of the oceans which have made navigation so easy and safe.

Many similar remarks might be made about the way in which various interests are hampered by taxation, but only a few further subjects can be touched upon. On the Continent it frequently happens that towns induce capitalists to build factories within their boundaries by letting them have the land free of rent and rates, for these towns evidently think that factories increase the wealth of a locality. In England the tendency amongst town councillors seems to be to drive factories into the wilderness. Not content with the rates which directly or indirectly are drawn from the workmen, every artifice is employed for over-rating industrial undertakings which cannot of course suddenly shift to another locality. These factories are denied any practical control of the local expenditure, and they are plagued with smoke inspectors and others, and possibly interfered with as regards trades union wages clauses, etc. These incongruities are directly traceable to the change which has been brought about by substituting town councils for vestries and similar controlling institutions. English towns had grown up under the older system which erred perhaps on the side of excessive economy; street widening, drainage and water schemes being dealt with in a rather petty spirit, but the general effect of the old system was to build up thriving towns. With the new order a change has set in. Towns are altering in their characters. Instead of being manufacturing

centres they are emporiums, shop and warehouse conglomerations, while one after another, factories are transplanted into the country. This may be desirable, but the fact that a change is being brought about demonstrates that an incongruity has been introduced. Town Councils are now elected by what may be called universal suffrage. They are tempted to raise the rates against the industrial and moneyed classes so as to spend the money on the lower classes, who are their chief supporters. This is a sort of robbery not unmixed with fraud, for councillors are ostensibly elected, as are members of Parliament, to look after the administration, to see that money is not squandered. Instead of that they formulate conditions which ensure that the highest prices shall be paid for everything. A comparison with the Admiralty proceedings will make this clear.

It is one of the coveted distinctions of contractors to be put on the Admiralty list, that being equivalent to a Certificate of first class work, and it is certain that Admiralty inspection is not only severe but often unnecessarily particular and annoying, encouragement being given to the condemnation even of mere blemishes, let alone substantial defects. On the other hand, Town Councils profess to be anxious only for cheap work, but most of them have subscribed to the trades union wages clause, and their inspectors are more concerned in seeing that these rules are enforced than in looking after the quality of the articles supplied. The result is that practically all first class manufacturers are on the Admiralty list, and these refuse even to tender for Town Council work, or if they do, they quote prohibitive prices, preferring not to do work which will be subjected to meddlesome interference. Their fictitiously high quotations are then naturally pointed to by Town Councils, as showing that their own favoured contractors are also the cheapest, whereas the truth is, that both better and cheaper articles could

be got if first class makers were encouraged to undertake the work.

These subjects will by many be considered controversial and even political and as there is no intention to take sides they cannot be pursued, but without breaking through self imposed bounds, mention may be made of old age pensions because they have now been adopted. Income and expenditure are equal, and whether they like it or not, the working classes will find out that if they are to receive many millions through the state, and if these are not put aside and saved,—and they surely will not be saved,—the wages of the working classes will automatically sink by just as much as the addition received in pensions. The money has to come from somewhere, and if it is put into one pocket it will have to be taken out of the other, and finally, of course, all taxes are paid for by the actual producer, which is a matter that no Parliament can alter. An impartial analysis of the vaunted increase of pay, which trades unions claim to have effected, will doubtless show that this gain is just about balanced by trades union contributions, and more than balanced by increased cost of the distribution of the necessities of life.

The incongruities with which the whole subject bristles are due to the British state having been built up as an agricultural one, and having suddenly—fifty years being a short span in the life of nations—changed into an industrial one. Living out of doors in fresh air and doing hard work, farm labourers used to thrive in spite of small huts and a relatively simple food. When they grew old, sick or infirm, they would still be provided for by their landlords. There was no compulsion either by the state or otherwise, everything worked naturally and equitably. Suddenly the inventive genius of a few mechanics showed how our as yet buried coal resources could, with the help of labour saving machinery, enable one man to do as much skilled work as twenty did before. The factory owners who now rapidly multiplied, tempted the

young farm labourers to leave the farms for the towns by prospects of what looked like higher wages, but which were unassociated with free houses and old age provisions. This injured the farmers, for they had to pay higher wages. The industrials did not care, and having once tasted the pleasure of rapid money making, they desired to increase their profits by keeping down their workmen's wages. This could not be done unless food was cheapened, and they finally abolished all import duties on corn and placed our heavily taxed farmer in competition with the untaxed farmers of virgin soils. This had the effect, not of reducing the price of food stuffs, which is regulated by the dearness of production in England, but of reducing the output of the farmers, whose superfluous hands could now be engaged by the manufacturer at the minimum wage. Nevertheless, the industrials were not content; they did not rest until machinery was so much improved that women and children could work it, and then, instead of paying one man enough to keep a family, they got the services of three or four members and naturally paid them no more than they would have had to pay the father. They thus increased their output without increasing their expenses, for by taking families from their homes, hardly any expensive comforts were required by them. It did not matter to them that they were ruining the home life of their workpeople. But that was not all; valuable machinery had to be worked by energetic and skilful hands and old workers were not wanted. Instead however of providing for those whose life energy had been used up in enriching the industrials, they turned them out to be paid for through the local unions, and out of the rates to which farmers and others had to contribute. This principle has been accentuated by the passing of the old age pension scheme. This action of the industrials as a class has been quite in accordance with that of one of their pioneers, Sir Robert Peel. He and a few others paid a guinea

apiece to be allowed to look at Crompton's new invention; the acquired knowledge enabled him to improve his factory and to grow immensely rich, and in his benevolence and out of thankfulness he paid, so one would imagine, a large sum of money to Crompton. No! his kindheartedness was of another stamp; his son obtained a grant from the Government, money which had been paid by farmers who had placed him in power and whose interests he betrayed.

The reckless hunt after profits is also responsible for the squalid conditions of our manufacturing towns as contrasted with our rural towns and continental ones. There the aim seems to have been to ameliorate the condition of the people and to provide them with fresh air, good food, and cheap and innocent amusements. No objections have been discovered anywhere on the Continent to combining music, dancing, eating, and drinking in the popular places of entertainment. Here the tendency has been a different one. Without serious reasoning, industrials came to the natural conclusion that if their workpeople could spare money for amusements, then their wages could stand a reduction if only amusements were curtailed or removed altogether, and they therefore encouraged each other and their friends and the nation to believe that it was wicked to let workpeople have comfortable enjoyments. Difficulties were put in the way of theatrical entertainments, dancing and music in restaurants, and these places were heavily fined in order, so it was hoped, to reduce the number of drinkers. The result has been the closing of all harmless places of comfortable amusement and the creation of the modern public houses, which aim at providing bare standing room for their victims, the most profitable conditions being attained when those who wish to drink have to elbow their way through a dense crowd, deposit their pence, toss off their drink, and go out again.

Some American industrials, in spite of strong money making desires, have adopted a better policy. It is true

they plant their factories in isolated spots, but they provide stores where things can be bought almost at cost price, and instead of merely encouraging entertainments, they actually provide theatricals, concerts, etc., at cost price. Under these conditions workmen's lives are pleasanter than here and the masters can still afford to pay relatively low wages, for the numerous credit giving shops, and other parasitical institutions which drain the workmen's surplus are absent there.

State Incongruities: Property.

It has always been felt to be a difficult matter to sway multitudes with sufficient celerity for instantaneous and energetic action, and states have, therefore, always encouraged and yet dreaded the concentration of power in single hands. The feudal system had the effect of singling out and rewarding the most grasping and the most unscrupulous individuals of a nation. As long as their services could be relied upon, the state did not mind how much the serfs, the individuals of the nation suffered, but the Reformation has shown that the nations of Europe thoroughly condemned the system as being both a state immorality and a crime, for while it encouraged the instinct of appropriativeness in a few, it crushed almost every natural instinct in the multitude.

Modern States are guilty of the same incongruity or immorality and criminality combined. Innumerable property laws still encourage the appropriative instinct of a few, and the Limited Liability Companies' laws have given such exceptional encouragement to directors and to Company promoters and organisers to intensify their appropriative instincts, that nearly every state is viewing with alarm the enormous power which is wielded by trusts, combines, and financiers, and the general public are feeling more and more clearly that it is a state immorality to pour wealth, and with it power, into the hands of

individuals and families who rarely give proof of the possession of any other gift than the sordid one of turning everything into money. They have invented the saying "Time is money," and to them patriotism is a weakness of the multitude, science is encouraged because there is money in it, not because of any love of research, art treasures are collected as a speculation or glorification of their name, and success is measured by the wealth which a man can amass. And to make matters worse, the ennoblement of families which nominally, at least, used to be carried out as a reward for state services, now falls to those who have cheated their neighbours or robbed the State.

No wonder that in every state dishonest commissioning and bribery and corruption are rife, and no state can claim that it has yet enacted laws which shall deal with this immorality in a practical manner. Legislators, emulating the Greek sophists, amuse the public by discussing whether the giver or the receiver of bribes and dishonest commissions is the wrong-doer, instead of adopting the more straightforward view that both are scoundrels, and that both should be encouraged to be the first to denounce each other. These immoral state tendencies grow out of the state ideal, which in itself seems to be perfectly correct, that a nation's power increases with the wealth which its subjects can acquire, and that the appropriative instinct should be encouraged, in the same way as the Spartan state idea of increasing the craftiness of its citizens made it appear desirable to teach children to steal their food and their brides.

In addition to immoral state ideals of personal property there are also criminal state ideals, such as those which tend to crush the instincts of appropriativeness, of saving and of hoarding in anticipation of bad times, old age, and for future generations. In this respect nearly all communistic ideals about property are of a criminal nature, and it should surprise no one if the unchecked regulations of

modern trades unions, which forbid their members to engage in more than one trade, and which hinder them from earning more than a fixed wage, have disastrous effects even on the character of a self-reliant people like the English. Is it not absurd that a ship's carpenter may not handle a piece of wood which is less than 2 inches thick, and that a joiner may not handle wood which is more than $2\frac{1}{2}$ inches thick?

On the Continent, the self-reliance tendency is being crushed by the continual insistence on obedience to orders on the part of children, wives and men. It has already produced so strong an effect, that even in the highest administrative circles the absence of a spirit of self-reliance is a marked characteristic against which, in the armies at least, it has been found necessary to struggle by compelling men and officers, who seem to possess a nature capable only of obeying, to think for themselves.

The state ideal of World Empire, which is so prevalent amongst the continental monarchies and republics, is the parent of many state crimes, and, as regards those dealt with here, has exercised an influence even in trade and peace-loving countries like England and Holland. The World Empire ideal demands exertions of an unremunerative character, as unremunerative as amongst individuals is the art of fencing compared with any of the numerous handicrafts. Both Rome, and more recently Germany, discovered that the power of nations, the capability of exertion, depended on their taxing power and therefore on the earning capacity of their subjects. Money making by all possible means has been excessively encouraged, but then the incongruity is created that the larger state and the sub-states, trades unions, local authorities, railway and shipping combines, sit expectantly around the industrials and rapaciously devour any surpluses which they may create. Laws, regulations, etc., are to these monsters merely instruments of extortion, and the only reason why

the money makers of to-day are not robbed by the State and states within the state, as Jews used to be robbed in days gone by, is because this would kill the goose which lays the golden eggs. Occasionally, as in Germany, the state, jealous of the profits which, for instance, railway companies make, swallows these up and reduces the cost of carriage, but this is done chiefly for the purpose of being able to extract more money out of the industrials.

Why then do not states with World Empire ideas turn from taxing methods to the socialistic idea of state industries and state trade? Certainly it is not because of any feeling on the part of the state that it would be committing a state crime by utterly crushing individualism, for that is its ulterior object, but past experience has shown that state industry and trading have a paralysing effect on the state itself, and there are not wanting signs that state monopolies of the postal and telegraphic type, of railways, of gas, water and electricity supplies, beneficial though they be in many respects, are creating conditions which are state evils.

Amongst the many alleged reasons for the fall of Rome, frequent reference has been made to that Empire's state trading. Step by step from mining undertakings, municipal trading, and manufacturing monopolies the principle grew and grew until it embraced every remunerative undertaking. No cloth could be worn, no bread could be eaten; and going back to a more ancient empire, to Babylon, no brick could be used which had not the imprint of the state trade mark. It is not necessary to enter into the question why this particular state activity resulted in a stagnation of trade, but it is an interesting fact, and should give pause to those states which are tending in the same direction, that one of the most disastrous effects of the Roman state trading was the emigration of gold and silver, chiefly towards the hoarding East. The result was the hopeless impoverishment of

Europe up to within comparatively recent times and the remarkable slowness of its revival.

Even mere state regulations of trading processes, from which fortunately England has suffered less than almost any other nation, are never quite beneficial, and always savour of state immorality or state crime according as to whether these regulations encourage or crush sub-state tendencies. As a notable instance may be mentioned the very heavy taxing of ancient insurance policies and their subsequent sudden encouragement. Surely the new relief given could be called neither an immorality nor a crime, and yet it was soon clear that the encouragement of the saving instinct in the form of insurance, led to infanticide and incendiarism, and it was thought wise to burden insurance, except on sea risks, with certain irksome disabilities which restrict infantile insurance to definite cases, and fire insurance to less than the value of the property, so that fire insurance companies, interpreting the law in their own favour, declare that value means sale value, and not the price of renewing goods. It seems strange, in a country where the beneficial guiding influence of coroners' inquests has been felt for centuries, and where official inquiries into the losses of ships, into mine disasters and into railway accidents is so highly appreciated, that inquiries into the causes of fire should never have been dreamt of as a means of reducing them and incendiarism, and that the more meddlesome plan of forcibly limiting every one of tens of millions of insurances should have been adopted.

Our bankruptcy practices are of interest not only because they are wonderfully incongruous but also because they illustrate how some well meaning, but shortsighted, legislators can play into the hands of those whose evil practices they wish to abolish. It must never be forgotten that during the Dark Ages the property idea, as the ancients knew it and as we know

it, had vanished. The strong man took and held as much as his power allowed him, and only very gradually did the inhabitants of towns invent laws which protected the property of the non-fighters. These laws were of the harshest, nor were they toned down, but rather accentuated when the property idea extended to promises to pay, for it seems to have been felt that to purchase goods on credit and then not to pay for them, and to borrow goods or money and not return them, was of the nature of robbery and ought to be punished as severely as ordinary theft, more especially as the time had passed when a man could sell himself and his family to pay his debts. The result was that inability to pay was for centuries punished by imprisonment, until at last it was felt that enforced idleness was about the worst means that could be employed for making a man earn money with which to pay his debts, and it was also felt that inability to fulfil undertakings was not necessarily a crime but more generally due to a misfortune which might have befallen either the debtor or the creditor. A ship might founder, a market might take a wrong turn or debtors might fail. Possibly too, some members of the upper classes were envious of the money making opportunities of traders, but dared not as yet copy their methods until the harsh Urban law of imprisonment for debt had been removed. Our bankruptcy laws were devised to remedy these defects, and as even these laws were at first rather harsh, some kindhearted individuals arranged that they should not apply to the poor, the limit of indebtedness being fixed at £50. Those who owed less could not be declared bankrupt and could not be imprisoned for money, but can be imprisoned for not obeying a Judge's instructions to pay. It is very doubtful whether it is good law that a debtor is sent to prison if a Judge declares that he owes less than fifty pounds but does not pay as directed, whereas a debtor against whom a Judge decides that he owes more

than fifty pounds may declare himself a bankrupt and thus not only clear himself of all his debts but also remain out of prison. The kindhearted but muddleheaded limitation of our bankruptcy laws is based on the fallacious idea that rich people do not lend small sums of money, whereas it is well known that money lenders and debt collectors are generally very rich and grow richer day by day, because our County Court Judges give them every assistance to recover debts from those about whom they feel that they are at last unable to continue to pay high rates of interest. Similar remarks apply to sales on the hire system and back-door hawkers. The latter are flourishing more and more, although some judges have publicly stated that the power which hawkers acquire over servants and unprotected women is the cause of much sexual immorality.

The reasons why this incongruous condition is allowed to persist are similar to those which block all attempts at reforming the land transfer conditions. The legal formalities and proceedings have become so lucrative to a large number of lawyers that their 165 representatives dare not vote for drastic alterations, while the money lending interest as well as that of the small shopkeeper does not wish to be deprived of the debt collecting facilities of County Courts; and above all the trades unions know only too well that they could not engage in strikes as readily as they do now if shopkeepers should in future refuse to give credit, yet this they would have to do, for it is clear that if the bankruptcy facilities enjoyed by the rich were extended to the poor, any workman who had been living on credit for a few weeks need only declare that he has sold all except absolutely necessary furniture, and then he need not pay his debts. A similar system works well in Germany and if applied here might tend to create a saving spirit perhaps even amongst the Irish.

State Incongruities: Marriages.

The institution of marriage is based on the idea that increasing populations are an advantage to the states; it encourages the procreation of large families, and might make itself useful in reducing infant mortality, then also, by careful selection and restriction, as well as by cheap and good education, it might improve the race generally. Unfortunately the most glaring state incongruities at once present themselves. Marriage is worshipped in society, a powerful sub-state, for its own sake, and has by the Church even been raised to the level of a minor sacrament, while the objects for which it was instituted are not only ignored but are sometimes even combated by the state. In the Greek towns infanticide was decreed by law; with all modern nations infantile mortality is appalling, and above all, modern states make large families, which should be the objective of the marriage institution, a veritable burden to the parents. The children of the poor must go to school, and are not allowed to work for their parents. Real education amongst the middle and upper classes by the state, including Universities, is made almost prohibitively lengthy and expensive. And what is the reward? The education provided by the educational sub-states is at best extremely classical, arranged to produce a peculiar species of bipeds called gentlemen, who get on in life chiefly because schools, colleges, and circles hang together, and who support even the most useless of their own lot, while preventing better characters and better trained men from gaining positions in which they might be of service to the state.

It is not surprising that the old state idea of the Greeks, about its being meritorious to bring up a useful member of the state, not necessarily one's own child, has died out. Those who give money for educational purposes, chiefly by founding scholarships, do so in order to have their names perpetuated, yet Socrates would have been forgotten

if he had not educated Plato. Plato is almost always remembered as the rearer of Aristotle, etc., and Aristotle as the teacher of Alexander. To have one's name associated with that of a rising young man, by supporting him in his youth or by starting him in life, is an idea which, if it ever occurs to anybody, is at once crushed for fear that the world might think that the youth is a secret relative. Why should such a fatherly support be a disgrace even if the report be true? This timidity is another glaring state incongruity, for, according to notions which are held in almost all circles (sub-states), it is more honourable for a man to disown his own children, if illegitimate, to starve them, to stint them, and crush them, than to devote his savings to public charities. Charity may cover a multitude of sins, but to buy absolution for the sin of pauperising his own children and by disinheriting relatives, is like paying Peter's pence and then robbing the collector. This modern practice is quite contrary to the ancient Germanic spirit, which is, perhaps, only temporarily dormant in us, and in Sweden has never died out, where it is of the nature of a custom for friends to lend money to impecunious students who promise to repay when grown up, and generally do so.

In Europe the forced celibacy of a large proportion of the females of the upper and middle classes is also a state crime, though not associated with the same serious consequences as those of polygamous states. The larger state, by employing unmarried women in the post office and other civil service positions and dismissing them if they marry, officially crushes the sexual instinct in many; in other words, this action is a state crime, and related to the institution of nunnery. Local authorities deal similarly with their teachers and other female employees. Both large and small states discourage marriage by making it a burdensome condition, and factory owners, by encouraging female labour, have produced a state of things which, with greater scientific accuracy in political economy might

have been foreseen, and which may be briefly put thus. Young factory women and men spend all they make. If they marry, and if on account of children, the wife stays at home, the husband has single-handed to provide for three or more individuals, whereas formerly, he provided only for himself, his wife providing for herself. No wonder that even thriftless workmen think twice before they marry for life, and then only if the girl has saved a dowry, as is the invariable practice in Lancashire factory districts. It is no wonder that in addition to committing these crimes, the larger and smaller states are, by their severe restriction, also committing immoralities by encouraging ever increasing numbers of female civil servants, teachers, and factory workers to indulge in illicit love. What makes matters worse is that by driving girls into employment, they become incapable of making home life a joy to themselves and their families. The experiment of making wage earners of women is a comparatively modern one, but already it is apparent that it will not take many generations before this will lead to a new order of things. If the movement should be a well sustained one, there are possibilities that not only views on puritanism and marriage may be shaken to their foundations, but even the objective of marriage, the increase of population, may be treated as an antiquated myth, and a new tendency, related perhaps to that of the Greek statelets may be initiated, in which infanticide was by law ordained, so as to keep down the population, or perhaps another extreme condition, now said to exist in Bengal, may be reached, where, according to J. Campbell Omar, in his "The Brahmans, etc., of India," 1907, "About forty to fifty million people of that province worship Durga, or Kali and her divine consort Siva. In their worshippings every man represents Siva and every woman Kali."

It is almost to be expected that state interference with such instincts as the sexual one must result not only in

incongruities but also in state immoralities and crimes. In Japan, and occasionally on the Continent, in Europe before the discovery of America, in ancient days in the temples of Venus, etc., prostitution is, or has been either encouraged, or at least recognised by the state, and from a purely hygienic point of view, which does not concern itself with the reason, why there are so many unmarried men and women, this is by some thought to be the best that can be done under exceptionally complicated difficulties. Another question which will naturally present itself, is whether the state is not committing an immorality by encouraging men and women to live married lives, for is not this close association an intensification of the sexual instinct? Some sects, as well as those who believe in monasticism, think so.

It is, however, rather amongst the sub-states such as social circles or grades, religious sects, etc., than amongst the larger states, that marriage and its due performance are insisted upon. The larger states and their laws do not look on the marriage contract as being of more importance than the marriage object. Some states punish prostitution but not adultery, and English law, by arranging for the King's Proctor to intervene in divorce cases, seems to take it for granted that some husbands and wives follow Plato's teachings and connive at or encourage what now ceases to be infidelity. Social circles take the other view and have enacted severe laws against such possibilities. This complication is one of a number of incongruities arising out of sub-states having different aims from the larger state.

Polygamy may be also looked upon as a state immorality. This institution, by providing for a change of wives, seems to have but the one object of intensifying the sexual instinct, for concubinage does not improve a race; there is no advantage to the nation in the existence of large and powerful families, and the accompanying forced celibacy of a larger proportion of the male population is

not only a state crime, but the cause of unnatural sexual excesses.

Modern society, as is well known, mercilessly makes permanent outcasts of unmarried girls who may have followed the dictates of their hearts without signifying their intentions in marriage registers. This too, is both a state crime and an immorality, the former because of the desire to crush an instinct, the latter because by driving these girls into prostitution, the very effects are encouraged which the harsh rules are supposed to discourage. Society is a female institution, and therefore not very logical, but if, as seems to be, its aim is to find husbands for eligible girls, surely it is a wrong policy to create prostitutes, because every addition to this army may certainly be reckoned to be the means of retaining several men in a state of single blessedness. The whole proceeding is extremely incongruous.

The non-interference of the state on behalf of widows is also of the nature of a crime, or at any rate, very incongruous. In other matters the state refuses to sanction contracts and restrictions which would prevent a man from carrying on a certain trade and it also refuses, except as regards entail, to sanction testamentary dispositions of personal property which bind future generations, but the state allows a man to threaten his widow with disinheritance of her means of sustenance if she marries again, *i.e.*, if she acts in accordance with what both the state, the church, and society encourage. These tyrannical dispositions are so frequently being copied by lawyers from one marriage settlement to another, that it is a wonder that they have never been challenged either in a Court of Justice, or by threats to disgrace the family name.

The state object of marriage is a lofty one, being as it is the perpetuation and improvement of the human race. Marriage is to provide large families of healthy and intelligent citizens. Somehow, even more so to-day than formerly, in spite of Darwin's teachings, and in spite of

every school experience that the parent stock counts for everything and teaching for little, the state, or the bulk of the nation seems to believe that, as regards these objects, the parents count for nothing and education and training for everything, and then the incongruity is committed of taking farmers' children from the fields and woods and teaching them things which are useless to them, and of taking children of hard working and skilled artisans and placing them under the care of teachers who, because they have emerged out of hovels or highland wildernesses, are content with underpayment.

It is, however, certain that parentage is not as unimportant as those who cannot even name their four grandparents would make us believe. Certain families, not necessarily noble ones, have produced a succession of great men, or men predisposed in certain directions. Criminality, imbecility, and other defects are heritable, and the pauper population testifies strongly to the fact that thriftlessness is heritable and cannot be educated away. No wonder that in all European states 50 per cent. of the male population are unfit for military service.

With increasing researches, old views about the pernicious effects of intermarriages, and of marriages with defective individuals are being fully confirmed, yet the state, which aims at having a population of healthy, clear-headed, hardworking, and thrifty people, has no objection to cousins, second cousins, and in Germany uncles, aunts, nieces, and nephews marrying, and in some Greek towns even parents and children, brothers and sisters used to marry. Deafness, dumbness, and all heritable diseases are no bar to marriage. Imbeciles, unless they are so bad as to have to be locked up, may marry, and so may confirmed criminals, drunkards, and paupers, and they may over-populate the land with diseased, idiotic, and thriftless children. Madness and crime are not valid causes for dissolutions of marriages, and so-called cured madmen may actually demand restitution of conjugal rights. Yet

the same state decrees that children shall be a burden to those who have any sense of responsibility, that a vast multitude of healthy and often gifted females, who might be mothers of worthy citizens, shall live and die in single blessedness, and society encourages well-to-do married women to remain barren. Would it not be well to sterilise the unfit by Röntgen rays or other modern means and encourage the fit to bring up large families?

State Incongruities: The Drink Question.

An incongruity growing out of the state's interference with the feeding instinct, including thirst, may here be mentioned. There cannot be a doubt that civilisation, and especially the sub-state called Society, intensifies the feeding and drinking instincts. The invention of cooking foods has, of course, facilitated digestion, so that human beings need not feed all day like ungulates, but the social functions seem again to aim at reducing the human race to that level. This is especially the case in some Continental districts, where a start is made with a light breakfast, followed by a second one either with beer or wine, then a substantial mid-day meal of many courses, probably an afternoon coffee or chocolate, a drink in the gloaming while lamps are being lit, a cold supper about seven or eight, and something before going to bed. Formal dinner parties may commence about 3 p.m. and continue at the rate of one course per half-hour up to eight or ten o'clock, or later. Now people who submit to these rules seem to live for the sake of eating and drinking, because during the short intervals between meals they will feel more inclined for a rest than for hard work, and thus the invention of cooking, which should shorten meals and increase the time available for useful work, encourages many to eat all day long and to be idle. Possibly because idleness is unnatural, the unemployed take to eating and drinking and smoking as being the easiest occupations.

The state interferences with the drinking instinct are still more incongruous. Pure water is probably one of the most wholesome beverages, and modern states do their best to supply their citizens with this commodity, but many waters, notably in hot countries, are poisonous, in the same way that many raw foods, for instance, pork with trichinosis, infected preserves, etc., are diseased. Not only is the effect of apparently pure cold water poured into an empty stomach in itself dangerous, but modern researches have revealed that most waters contain disease-bringing microbes. These inquiries also seem to confirm the oriental experience that standing waters, even when almost putrid, are less dangerous that running ones, the injurious microbes having evidently been destroyed while at rest by sun-light or by other microbes which are less harmful to the human body. From the earliest times people have tried to make water less deadly or to find a substitute for it. Boiling was inconvenient before matches were invented, but this process is absolutely efficacious for killing microbes, and as it is possible to raise water to a boiling temperature and cool it again with an expenditure of less than say one pound of fuel per 1,000 pounds of water, it may one day come to be considered a state duty to carry out this manipulation with drinking water. The ancients invented fermented grape juice, which if mixed with water seems to kill microbes, at any rate the Greeks looked on wine as such a beneficial drink that they deified it in the shape of the gods Dionysis or Bacchus. The Arabs invented distillation, and were able to produce strong alcoholic drinks. The Germans invented beer, which in its mildest form is little better than boiled water containing a small amount of wholesome nourishment, a little alcohol and an agreeable flavour. It is only necessary to spend an evening in a brewing city like Munich to be convinced that this beverage can be consumed in enormous quantities by the

larger proportion of the population without producing any intoxication or other injurious effects.

For some strange reason a large section of the British public (a sub-state), the teetotalers, has been taught to believe that alcohol is the Devil incarnate. They pin their faith to this dogma, and are blind to the incongruity of saying that an invention which kills disease germs in water must be an unmixed evil. They have carefully put on blinkers, and their gaze is fixed on alcohol in the same way as the gaze of the Jews was fixed on the crucified image of the serpent from the days of Moses to those of Hezekiah, in the hope of keeping serpents out of the land. It would be amusing, if it were not too sad, that in their semi-blindness, while striking at their fiend alcohol, teetotalers have actually increased the very drunkenness which is the evil of which alcohol is but the crucified image. In order to restrict the sale of all alcoholic drinks, teetotalers have entered into a compact with the Treasury, the brewers and distillers laughing up their sleeve all the time, that all sellers of alcoholic drinks shall pay heavy licensing fees, that they shall be fined unless their alcohol and wines are of standard strengths, and that, all alcoholic drinks shall be heavily taxed. Because people can obtain powerful intoxicants they buy them, even when they are not thirsty, on account of the agreeable sensations which they produce. The result is that public houses have enormously appreciated in value, though in most of them there is neither space nor convenience for eating a meal. Now one of the chief inducements to the publican to sell strong spirits is unquestionably produced by the blind desire to tax alcohol heavily. Assuming that the cost of carriage over the average distance to which drinks are transported in this country is 40s. per 1,000 gallons, and supposing that the consumer wishes to drink a beverage containing 5 per cent. alcohol (light beer strength) then, as distillation costs very little, it is profitable to extract the alcohol, reduce the bulk to 200 gallons

of proof spirits, and to transport these at say one-fifth the cost, say 8s. These 200 gallons would then be mixed with nine times their volume of water, possibly unboiled, and full of microbes which are not killed, and these 1,000 gallons of weak fluid would be 32s. cheaper than if transported in bulk. If however the Government could be induced to impose a heavy duty, say 40s. per 100 gallons of pure alcohol over and above the first five per cent., which might go duty free, then the freight of the 1,000 gallons of five per cent. beverage would cost 40s., no duty having to be paid, and the freight and duty of the same amount of alcohol reduced to 200 gallons of proof spirit would be 8s. and 36s., making a total of 44s. Under such regulations the present tendency to produce and to sell strong drink would die out and with it the temptation to take the strong drink neat without being thirsty, merely as an appetiser, pick-me-up, or rapid intoxicator, a tendency which is strongly fostered by bad cooking and quarrellings at home. There would be this further advantage that as the brewed drink contains only boiled water, it would minimise the possibility of an epidemic during an outbreak of cholera or similar plague.

During the last cholera epidemic in Hamburg, a builder courageously erected wooden hospitals which were being filled with dying patients almost before each hut was finished. Being firmly convinced, even in those days, that cholera was transmitted by drinking water, he arranged to have all his water taps sealed up or otherwise made inaccessible, and he erected two kitchens, one in his works and the other at the barracks, where both hot and cold coffee was on tap free of charge for all his hundred workmen. Only one of these men suffered from cholera, and that was due to his having for a wager drunk a glass of unboiled Elbe water. He paid for his foolishness with his life.

Teetotalers will say, why drink alcoholic drinks when tea, coffee, and effervescent fluids can be had? They are

still wearing their blinkers, and do not see that their own indigestion, most of them having a dyspeptic look, is probably due to these drugs. It is true that generally the theine, caffeine or tannin contained in their hot beverages is a very small percentage, but they dare not increase their doses, not even to one-tenth of what is quite safe with alcohol, for these drugs are powerful poisons, and powerfully affect the nerves, kidneys and liver. Effervescent waters are not necessarily boiled, and are occasionally putrid to the taste; carbonic acid too is a poison, which, even when it is balanced by a little alcohol, as in champagne, produces depressing nervous after-effects which are foreign to other alcoholic drinks, or at least differ from them. Thus the larger state, aided by the sub-state teetotalism, in its interference with the drinking instinct, has created the incongruity of doing its best to provide pure water and at the same time encouraging the consumption of powerful intoxicants and injurious alkaloids instead of beverages which have been boiled as a whole, or fermented. After all, a small percentage of alcohol is the healthiest antiseptic yet discovered, infinitely less harmful than boracic acid, salicylic acid, phenol, formic acid, arsenic, mercury, copper, etc. It has now been proved to be as good a food as sugar, and the old theory about alcoholism producing weak, incapable and degenerate children has been exploded.

State Incongruities: Education.

Education, the thinking process of a nation, is also full of incongruities. If it is to be as perfect as possible, no money consideration should stand in the way of attracting the best teachers. If the general complaint be true that the educated classes suffer from too much leisure, and that unless a man of means has a taste for making money or meddling in politics, there is no inducement for him to do work, then why does not the state make it worth his

while, either in money or position to devote himself to improving the understanding of the masses and producing worthy citizens? Schoolmasters' berths should be as much sought after as church livings used to be, and men, especially old and experienced ones, ought to vie with each other in their efforts to impart knowledge. Unfortunately, a feeling seems to prevail, more particularly amongst the lower classes, which by the trades unions are practically debarred from rising above the level of the casual labourers, that teacherships are legitimate objects of plunder. Things have now come to such a pass that one branch of the teaching profession is utterly despised, and respectable people will not make teachers of their children for fear that they may come in contact with individuals who in their parents' hovels have never had a chance of faintly grasping the idea of the decencies of modern life.

Another incongruity which is particularly noticeable in England, is to make learning, the acquisition of knowledge and refinement, excessively expensive for the middle classes. Professional incomes of £1,000 a year are not over frequent, whereas families exceeding three or four boys are far from rare, and to give to these children the education which a gentleman is supposed to receive, say in a public school at £150 per annum up to eighteen years, and in a University at £300 per annum up to 22 years or longer, is clearly beyond the means of the above incomes. Yet, although these parents pay heavily for education, the government does not even support the middle class schools with the grants which they would earn if they were educating poor children. State payments by results have been practically condemned, and school payments are now professedly controlled by voters who pay taxes, though in reality those who chiefly pay for the Board Schools are outvoted by others who do not pay. Is not justice quite as important as education? And yet our judges are not controlled by the taxpayer, for they are irremovable. Public schools cannot, of course, submit to

the levelling down process of being dictated to by the very tradesmen who serve them, but they deserve to be paid for as much teaching as they impart. The same remarks apply to Universities, which, although they receive government grants, nevertheless have to charge excessively heavy education fees, and encourage a most expensive and wasteful style of living. Broadly speaking, the state encourages the lower classes to study matters which should fit them for positions above those which their fathers occupied, and to which they are hardly likely to attain, and at the same time it throws obstacles in the way of making the better classes really useful in their particular spheres of life. The modern education which is imparted to the working classes is a bar to improvement in their trade, and seems only to encourage sporting and betting literature. Members of the upper middle classes, those in whom the saving instinct might have existed for several generations, and amongst whom many may have to serve the state, whose labours are absolutely dependent on learning, all these are discouraged from acquiring really useful knowledge by all the means which the state and the teaching sub-state can bring into play but they are crammed with classics. It will be contended that scholarships remedy this evil, and that although they were founded for poor boys, they are generally captured by the rich, who can afford to pay for coaching. Unfortunately, as already explained, early maturity of the memory gift is all that is favoured by competitive examinations and scholarships, and the backward Anglo-Saxon, for whom these scholarships were instituted, is put in the shade by oriental races whose children of 15 are men and soon stop developing. Besides, why should only the clever boy be favoured at school? Why should this single memory gift be exaggerated and his other gifts not brought out, and why should those who are second rate in memory power strain it to breaking point or be entirely neglected? This is a most glaring incongruity. The

rich boy with a good memory who could do without scholarships now receives one for the asking, and at school obtains semi-private assistance to help him to capture more honours. His dullard brother, with perhaps a good reasoning brain, on whose education the greatest care should be bestowed, receives no monetary assistance, and is neglected at school because he is not likely to gain distinctions at examinations. Yet amongst those who have gained scholarships there are many who curse the days of their early success, for they have become failures in life.

Schoolmasters freely publish lists of the boys who gain prizes, etc., but information about the public failures of their pupils is not to be got out of them, and such private inquiries as could be made, reveal that a scholarship hunter must have influence at his back if he is to succeed in life. This applies both to the rich and poor. This is not the fault of any particular school, but of the general system of scholarships and competitive examinations. Occasionally the bad effect of the educational system is counteracted by the genius of a head master, who may have the magic power of making great men of the majority of his boys, but that is essentially due to an adaptation of teaching methods to individual boys, instead of favouring only the brilliant ones, and, as an exception, it merely proves the rule. Kant's view was that, as the genius would be sure to get on and the dullard never, the medium boy should be encouraged by all possible means, but not overworked. From a few private statistics, usually rather fragmentary, it appears that many brilliant boys leave school in an overstrained or mentally crippled condition and are failures even at College. Of the brilliant boys who go into practice those make the best start who have the most powerful interests to back them up; those others who have neither money nor influence seem to disappear, many becoming utter wasters. At about 30 years most scholarship hunters are nowhere

in the race of life. It is at this age that that thinking portion of the dullard residue which has not yet been crippled by classics commence to take the lead. By that time experience has taught them to unlearn as far as possible classical dogma, precedents and methods; they have even forgotten the Latin *prepositions* which govern certain *cases*, but they are rapidly learning what are the *means* which govern the attainment of certain *ends*. One by one they adopt the motto of Emperor Maximilian, *respice finem*. This is not the womanly and Jesuitical ideal of thinking only of the object and not of the means. The sooner even a schoolboy understands how to adapt means to an end, instead of prepositions to cases, the sooner will he find himself on the level from which Napoleon started. Amongst this commonsense class there are to be found some to whom the means are as nothing compared to the objects to be attained, whereas the confirmed classic knows only the innumerable means which have been employed, and even if he does not grow to look on them as the object, he has become incapable of holding on to a definite one.

Of all sub-states in England the Navy is a pattern of good management. Is that possibly due to its members being recruited chiefly from the South of England, or is there something in the system? There is a strange difference between great English naval and military officers. On the one side are to be found Cromwell, a yeoman farmer, Marlborough a courtier, Clive an office boy, and Wellington who was educated abroad; on the other side the greatest admirals were educated and trained in the Navy. They were as much classical seamen as schoolmasters are classical scholars, and as the average military officer is a classical soldier. Of late there have been no naval actions which might reveal greatness, but the principle which the Navy has always adopted, of having its own system of education, as opposed to that of the rest of the nation, has achieved results in other departments

than that of commanding officers, which are worthy of the most serious consideration to all educationalists. Conspicuous amongst these results is the production out of the artisan class of the government dockyard population in the South of England, of the most eminent naval constructors which the world has ever seen, whereas the general educational system of the working populations of England, Scotland and Ireland has, during the last fifty years, produced no individual of even medium eminence. The latter effect is in part due to the levelling down tendency of the trades unions, akin to that of the ancient Roman Church, which represses independent thought and action, whereas in the Navy's educational system independence of thought, not perfection of the infantile memory gift is encouraged. In the Royal dockyards there are schools to which aspiring lads are drawn, the hours are short and some relief is granted from dockyard work to those who are studious. This is not the night class system, so common in some of our manufacturing towns where both ends of the candle of life of the young are being burnt at once. The Admiralty seems to have recognised that mental and bodily labours recreate each other if neither is carried to excess. As the boys grow older, their ranks are mercilessly thinned in successive batches of from thirty to sixty per cent., the observations of teachers and foremen going hand in hand with examinations in a slow but steady weeding-out process. An eye is kept on the best of the rejected lads who, on account of having received as much learning as is necessary, are now well suited for the positions of foremen, while those who are still retained at school have prospects of higher positions. Ultimately only a few of the best lads remain. These receive a special scientific and an additional practical training, and on entering the Chief Constructor's department they have every prospect of rising to become designers not only of monster battleships but also of ocean greyhounds, for on account of their

excellence there is a constant drain of these men from the Admiralty into private works. These great designers cannot even be produced by the educational process which ends at the Universities.

The training of naval officers and engineers is based on the same principle, which is to reduce to a minimum that portion of the training which is embraced by the term classics. There is probably no better school, not only in England but on the face of the earth than Osborne, but without government encouragement and in opposition to the petrifying tendency of classical Universities, which is felt even in the Navy, its methods cannot be imitated by our public schools. Really good non-classical teachers of commonsense habits of thought are very expensive, because they are so valuable elsewhere and as a general reduction in school fees is impossible, scholarship hunters cannot be kept out, and competitive examinations, not nominations and reports, are the only recognised means of advancement. Over exertion in sport, possibly as an antidote to monotonous memory efforts in one classical language, and the entire absence of practical pursuits, thoroughly differentiate the general educational system of this country from that of the Navy.

A departure has been made from the general plan here adopted of not making comparisons as regards merit between two systems, but the difference between the above two is too glaring to be passed over in silence. All that was aimed at, however, was to show up incongruities by contrasting two educational systems of which one is the attempt to perpetuate amongst changed surroundings the Renaissance system of schooling which was composed of: classics, fencing and riding, and of which the other is an attempt to educate boys for a definite object in life, for the Navy, and for the day of battle, in fact to make boys into men. Those who do not wish to let their children have definite objects, who wish them to lead aimless lives as mere social ornaments, should, of course, give them as

much of the classical system as has survived to our times; their boys will grow up to be the prides of their mothers, rapidly attaining the finality of faultlessly dressed gentlemen without an object in life. This is certainly the reverse of the education of the Roman *gens*. They learnt no classics but were trained in all the arts and sciences which make great administrators, generals, etc. England has in "gentlemen" adopted the name but not the true essence of the Roman *gens*.

State Incongruities: The Press.

The question of education is not exhausted with that of our schools, which should teach boys how to think, but new matter for thought is encountered by everybody, throughout life, and is also published in books, in the press, and preached from the pulpit and the rostrum. These sub-states are also full of incongruities and therefore deserve a passing notice, especially the press. In former days rulers had much to suffer from the pulpit, and when printing was invented they saw plainly that ideas which formerly could be imparted to only a few hundred listeners at a time located in single towns, or districts, could now be placed before millions of people all over the country. The effect of the invention of printing has been a great one, but not as great as was anticipated and feared, for the liberty of the press, the liberty to tell the truth has been abused, and sophistries and statements which are not strictly true are disseminated. Any institution which is based on untruths, or which makes use of them, invites attacks, so that it is no wonder that only spasmodically, as in the French Revolution, did the press attain a dominating position. The prototype of the press is found in the history of the Jews. They had kings and administrators, but they also had almost as many prophets as we have newspapers. To read of Ahab publicly asking his four hundred subsidised prophets whether he should

fight at Ramoth-Gilead, is like Bismarck instructing his reptile press to get up an agitation against a neighbouring country and like the press outburst in France before the Debate of 1870, Thiers' organ on this occasion representing the prophet Micaiah. The English press, as regards truthfulness about foreign affairs is unquestionably far ahead of any continental press, but as regards home matters it is no better than others. In that department the same system prevails as on the Continent with regards to all matters, only those subjects being mentioned which support the tendencies and arguments of the particular journal or party. Of two imaginary papers devoted to the canine and feline interests the former would publish all the noble deeds of dogs, the night howlings of cats and their cruelties and poaching tendencies. The other paper would send out its reporters to collect cases of cats having cleared houses of mice and rats, of having lamented the drowning of their young, of courageous defences against dogs, and of cat murders by these. The effect produced by such publications would be to make the dogs more canine and the cats more feline and to intensify their antagonism, a condition which is injurious to the harmony of the state. That a large state should encourage, often directly by subsidising certain journals, the dissemination of half truths and of lies which have for object the tearing asunder of the greater state is one of the greatest incongruities of the present age, but one which it seems difficult to remove.

The chief and quite legitimate object of a newspaper proprietor is to make money. He writes to please the people not to improve them, and if occasionally he sings a moral song, it is of the same class as Mephistopheles' serenade under Marguerita's window. The editor knows as well as every preacher knows, that the listeners to general accusations apply these to their neighbours and not to themselves. They instinctively recognise in others the blemishes of which unknowingly they are often the most

conspicuous examples. That is the reason why novels and plays with morals produce no effect. These institutions as well as the press would have far more influence than at present if, like Shakespeare, they confined themselves to portraying life, promoting truth and reliable information instead of expending their energies in twisting facts to suit their theories.

A strange incongruity is noticeable in some books, and in the press, but it is only apparent not real. "We," the editors and reporters pose as being superior to the wise men of the East. Phrases like "it is well known," "we remember," etc., are to be met with at every turn. Beware of these and verify what follows; it is generally a lie. The fact seems to be that journalists are journalists, as talkers are talkers; these can talk, those can write, but neither of them know; and thus it happens that newspaper reports of people's sayings or writings rarely contain their essence, but almost certainly some unimportant aside, generally such a one as gives a wrong impression of what was meant. There is probably no hard worked man who cannot complain that his real work is ignored by the press, and his few slips published and re-published as being the essence of his wisdom. Every expert, too, no matter what his field is, will give the assurance that although other information in newspapers may be true and valuable, that about his own subject is invariably misleading. The press cannot excuse this, but explain it as being due to its writers being journalists and therefore not conversant with particular subjects, with which remark one may safely agree.

State Incongruities: War.

A subject which always has been and always will be of interest is war. With the exception of ants, whose instinct is as wonderful in its way as human reason, there is no class of animals which engages in war. It is only

men with their power of abstract reasoning, who combine to form states and sub-states with the avowed object of making war on others, either sanguinary or commercial, either defensive or aggressive. Here again it is reason not the instincts which is the culprit.

Minerva or Pallas Athena, the goddess of Wisdom, *i.e.* of abstract reason, was also goddess of War; naturally too, she was patron of inventions, arts and sciences, for how can wars be carried on without their help? Probably if this goddess were still in existence she would have adopted additional titles indicating her patronage of the incessant modern wars between sub-states, between combines of labour and of capital, between aristocracy and democracy and between innumerable religious combinations. In addition she would doubtless be the patron of odd ideas such as protection and free trade, for these are merely two weapons with which nations are now carrying on wars as bitter and protracted as the two hundred years' crusade and our own Hundred Years' war with France.

Like the ancient gods, state ideas, in fact all ideas, have absolutely no feeling for the sufferings or the deaths of human beings; these are, as it were, merely clay out of which beautiful vases can be formed. The form of the vase, the ideal, does not care whether clay does or does not like to be wetted, kneaded, pressed, dried, burnt and glazed. In extreme cases, ideas which take possession of single individuals will cause even these to become martyrs, scientists will risk health and life for an idea, and political assassins will do the same. Why then should any great state ideas hesitate to employ human beings even unto death? The Roman idea of a World Empire is surely grand enough to ignore the millions of lives which it has cost and still costs. This great state idea of providing universal security of life and property is surely also worth human sacrifices, far more so than many religious ideas or dogmas.

Nevertheless, human beings have a strong feeling that

there is something immoral and criminal in wars, whatever their nature. This is due to the fact that states, rings, factions, or rather their leading ideas are looked upon as being individuals, and they certainly are represented by men. Almost naturally, therefore, any state idea which causes the death of human beings is branded as criminal, but as long as only the active fighters are killed, as long as these victims are part and parcel of a state idea, as long as a quantity of clay is the substance of a beautiful vase, it is difficult to differentiate and to pity the substance while admiring the form, but there is always a strong feeling of pity for any wasted material, for the peaceful inhabitants whom mercenary armies sacked and tortured in ancient days, for the helpless workmen who are starved because of a commercial war, or are thrown out of work because of a strike in coal, or a corner in cotton. The feeling about there being criminality in war lies in its interference with neutrals. The feeling that it is immoral lies in the fact that war intensifies the fighting and the destructive instincts of those who engage in it.

War is popularly associated with battles. These are mere incidents in the struggles between nations, and formerly when reasonings were more simple, even armed attacks were overlooked, in the same way that a hostile tariff is now, not necessarily a *causus belli*. Allowance is nowadays made for trading desires, as in former days allowance was often made for the human inborn love of killing something. Even now kings invite each other to shoot the deer in their private parks, rich subjects know that they can give no greater pleasure to their friends than to ask them to shoot over their preserves, and when this sport grows tame, some travel into wildernesses and, no matter whether there be food in the camp or not, they get sudden fits to go out and kill something, and return with the proud news that there are half a dozen harmless gazelles rotting on the veldt. Before the French Revolution, huntsmen returning home would fire at peasants

whom they might espy, and in the ancient days of robber knights, when killing something was probably the only sport, a raid like that of Cheviot Chase was of no more international consequence than the acquisition nowadays of a trading concession in a savage country, which some other nation might look upon as its particular preserve. If it suited a state, such acts would, of course, be taken as justifying war either commercial or sanguinary.

When Napoleon found himself unable to land armies in England, he waged war with her by instituting the continental trade barrier. He hit us hard at the time, and our final success on this battlefield of his own choosing seems to have led to the modern dogma that trade must not be prohibited, a convenient excuse for seizing or forcibly opening a few ports in China, Japan, and elsewhere. Yet if a comparison be made of the position of today with that of 1812 and earlier, it must be admitted that the present is no improvement on the past. Then England as well as the Continent suffered, nowadays even those who profit by the national suffering can hardly close their eyes to the fact that English workmen are receiving less than continental consumers are content to pay, and as the difference is at present used chiefly by other states for naval armaments, the English nation, including the working classes, has to spend double this sum in augmenting our battlefleets. It is one of the state incongruities that few people will bring themselves to declare that such actions are war. Surely murder is not confined to that instant when a dagger is plunged into a heart, it begins with its planning, with the time the weapon is bought or loosened in its sheath. Similarly real war does not commence with the first shot fired, but with the preparations and provocations.

Commercial wars are quite of the nature of real wars. Firstly it must be remembered that wars grow with the property idea. In the Dark Ages the property idea did not attach to land, but only to wives, cattle and implements.

According to the legends of early wars men banded themselves together to capture women, and our "best men" at weddings testify that even in the Middle Ages European brides used to be captured. The wooing of Henry, the first Saxon King of Germany, was of this nature. Formerly, too, implements were the immediate spoil of the victors, so much so that the giving up of a sword has up to now remained a sign of surrender.

At the end of the Middle Ages, with the dawn of the modern property idea, with the revival of trade and the return of gold and silver, everything, even land, was, as with the touch of a fairy wand, converted into property, and the small and endless feuds and plunderings of the nobility gradually died out in the face of the mighty efforts of whole nations to wrest wealth from each other. The rich republics of Italy played this game on a small scale until France and Austria fought for what disappeared whenever they laid their savage hands on it. Property vanishes where lawlessness prevails, and in those days the Northern States were, as yet, even without police, without judges.

Portugal wrested the Eastern trade from Venice, Holland wrested it from Portugal, and England from Holland. In these three struggles the sanguinary fights may be said to have preceded the commercial wars which then followed, for neither Portugal nor Holland lost all their Colonies. The fight with Spain was not for commercial advantages, but merely for plunder, and it was a few centuries later that England first re-discovered, what was well known to the Romans and the Venetians, that the transportable property of a nation is relatively very small, and that the richest spoils of war are trade, which can be made permanently valuable only by general order and security.

English warfare, since those days usually successful, has been undertaken with the object of civilising savage states, and making them valuable in the eyes of other nations,

so that Bismarck, representing the Lettish Junkers whose ancestors were mostly robber knights, started a scramble for them. Somehow the appropriated tracts of land have proved to be not only not valuable to their possessors but are still very expensive luxuries. Yet one day perhaps the attempt may be made to acquire by armed force the beneficial control which England exerts on a large portion of the world. Certainly the most self-sacrificing efforts have been made by more than one nation, whose people freely let themselves be taxed as heavily as in war times, by the shape of protective duties and shipping bounties, because it is hoped that by these means it will be possible to injure English trade and power. Either of these means may be successful. Strange to say the English nation does not realise that it is now actually waging war with the rest of the world, and that at any moment a real, sanginuary war may ensue, and that it may develop in a direction which would be surprising to all.

In the Thirty Years' War it was the desire of one side at least to exterminate heretics, and this objective was nearly attained by reducing Germany to one quarter of its former population. Some subsequent wars were undertaken for the acquisition of the productiveness of certain lands, and the principle of extermination gave way to that of crushing the enemy's army, and protecting the peaceful population, who were of course, possible future subjects and workers. This has been England's practice for centuries, so much so that the majority of Englishmen are quite horrified to think that any war should injure those who have not been actually fighting, and in the bottom of their hearts there lurks a feeling, which is a powerful force against conscription, that if a man can say that he has never even been trained to aim with a gun, surely the enemy will not injure him. Has he not made himself an accessory by paying taxes? On the Continent, very different views are expressed, but there every member of the state is bound to assist in time of war, and it would

not come as a surprise to them if the old principles of making war on the whole nation, including the women, were reverted to, even by their rulers.

Now a war against England would only be undertaken with the object of destroying her industries and trade, and in the belief that because the rest of the world would benefit, interference by other industrial states is not expected, provided that instead of conquest the destruction of productive property were made the chief aim of an invader. Then of course there would be no reason why the productive workers should be preserved.

If, therefore, it should happen—but it is to be hoped this will not happen—that a foreign foe should land on these shores, and if, as would certainly be the case, he should have difficulties in bringing sufficient provisions with him and, as England does not contain enough for her own wants, there cannot be the least doubt but that the peaceful population of the districts occupied by the enemy, men, women and children, young and old, would be told to "go!" but to leave their provisions behind them. These, especially in any of the agricultural districts, and in large import centres, would certainly suffice to keep alive for more than a year, an army of several hundred thousand of men, while the fugitives would, of course, have to be fed by the already crippled state, and would there accentuate the scarcity of foodstuffs. The whole of England produces one third of her food supply; if therefore one-tenth of the land area and grain stores in towns should fall into the enemy's hands, they would be found to hold enough for feeding three per cent. of forty millions, or enough for 200,000 during six years. If care were taken that no unnecessary waste occurred, and if agriculture were indulged in by the invading army, this supply would be considered ample for its requirements. It will be said, "Surely the barbarity of expelling non-combatants would not be practised! for did we not actually provide camps and food for the families of the Boers who fought

against us?" Exactly so, but it must be remembered that a general who has got his orders to maintain his position, will, even without superior instructions, do what is requisite. Alva was told to restore order in the Netherlands. His master merely did not interfere with his doings when he utterly destroyed several towns with their inhabitants, and in cold blood executed 18,000 individuals. Davoust had orders to prepare Hamburg for a siege; he carried this out by, amongst other things, suddenly driving tens of thousands of peaceful but useless inhabitants out of the town. It was winter, and everyone of the crowd was dead before break of day. There is no arguing with the commander of an army. He does not think in words, like public orators and newspaper writers, his actions are his thoughts.

The probability of an unprovoked attack being made by Germany like that of Frederick the Great on Saxony, is remote only as long as England shows her strength, nor is it likely to occur as yet, for when von Einem recently resigned his position as Chief of the German general staff it became apparent that a feeling still exists in the general staff that the Emperor may possibly insist on his own ideas being carried out both in an elaborate campaign and on the battlefield. Here too it appears that a so-called absolute ruler is not a real autocrat, and that probably the interests of his people force themselves into bureaucratic circles and influence state actions more than is commonly believed to be the case. It would, therefore, be no surprise if, when the Imperial German Crown passes into weaker hands, the strong desire of the industrial circles of Germany to continue their recent rapid rate of expansion by forcing England to surrender some of her Colonies, or at least to give up the Monroe doctrine with regard to South America, and to withdraw from Mesopotamia, should result in a war which would then be under the sole direction of professional soldiers and sailors.

The ancient German tribes were drawn to the Italian cities because of their reputed riches, the Greeks and Phœnicians fought for each other's trade routes, Rome staggered through the three Punic wars for the wealth of Carthaginian Colonies, the Venetians alternately fought with and bribed the Turks for the Eastern trade route, Holland struggled manfully against Spain for liberty to trade, and France and England have fought many a war for colonies and trade privileges. Property has since the Dark Ages become something worth fighting for, so much so that now it seems almost incomprehensible that at one time nations should have ruined each other for titles to be borne by their kings, or for shadowy vassalages which could rarely be relied upon in case of emergency. The fact that the rise of the property idea causes war was very painfully and very plainly illustrated during the reign of Constantine the Great. As a reward for the support of the Christians he allowed, what had not previously been the case, their Churches to hold property. The Church had up to this time been a peaceful and communistic society. Suddenly it was upset by the introduction of the property idea, and instantly there arose the most sanguinary inter-Christian fights for the possession of the various bishoprics. The lust after wealth was infinitely more powerful than the teaching of brotherly love which may be said to have been the guiding principle during the first three centuries of the existence of the Church.

In former days wars were exterminating processes. The injured of the vanquished might die on the field, the prisoners were brought in triumph to Rome and thrown into the arena or together with their wives and children were made slaves. Whole tribes were now and then entirely exterminated. The idea of healing a wounded enemy was an absurdity until in the Middle Ages it was arranged that he could be ransomed for money. Now, however, that a war is carried on with the object of acquiring the wealth producing power of another nation,

its agriculture its mines, factories, shipping, and because this stream of wealth dries up if the working population is annihilated, war has become a wonderful incongruity. Everything is done to disable combatants, but no sooner has a soldier held up his hand, no sooner is he wounded, than everything is done to save his life.

This humanitarian incongruity was carried to an extreme, which may become the turning point of the pendulum's swing, when England undertook to protect the women and children against whose husbands she was fighting. England played the part of Rüdinger in Kriemhilda's revenge. Hagen, the archfiend of the drama, having lost his shield, Rüdinger though fighting against him, hands him his own, and, defenceless as he now is, is immediately slain by Gernod, Hagen's companion in arms. Chivalry in warfare is an incongruity except in the past amongst Italian condottieri. They fought for the plunder to be found in towns, not with the desire to kill men, who might be brothers in arms to-morrow.

Many of the incongruities of war have been swept away by the French Revolution which revived the old Germanic and Roman idea that the freemen of a nation were the only ones privileged to bear arms. Of European states it is only England which still adheres to non-national armies in spite of the fact that England retained the old system up to the days of the Wars of the Roses, for though nominally every citizen is still liable to serve, only those who can find no other employment enter the army.

Modern European warfare has grown out of the Roman and Germanic tendency just mentioned, which allowed only freemen to learn the art of using dangerous weapons. Wars used to be carried out for the states in which the non-fighters consisted of a large number of slaves, but gradually, with the growth of the Roman armies, the fighting duties were delegated to national and foreign ruffians or wasters, and later even worse classes of castes and societies have come into existence who, though

refusing to fight, do not disdain to avail themselves of the advantages which a state, strong in military renown, affords to those who stay at home. That is the present condition in England where wars are undertaken for those who have invented a religion which says that fighting is sinful and that money-making is everything. On the Continent nations are pitted against nations, not mercenaries against mercenaries, yet a remnant of the spirit of chivalry operates, at present at least against the destruction of the industries of a vanquished country. Turenne it will be remembered tried to destroy the agricultural resources of the Palatinate because he could not retain it for his master, and in any naval warfare, the destruction of the enemy's merchant shipping is sure to be one of the belligerents' objectives because trade cannot be transferred by conquests. Those who sit at home and grow rich on the business which comes out of wars, naturally would desire to see commercial shipping protected from all enemies, and they grumble at the disinclination of governments to enter into protective conventions. They quite overlook the fact that war, like marriage, cancels previous agreements and that that state suffers most which trusts to treaties. It must never be forgotten that Cæsar, although an honourable Roman, having induced the chiefs of the Usipetes and Teuchteri to parley with him in his camp, detained them as prisoners and annihilated their leaderless warriors, and also that Napoleon broke through all conventions and traditions of his age.

In fact, all conventions dealing with war matters are very slender reeds to lean upon. If an advantage were to be gained nowadays by the use of explosive bullets, a man of Napoleon's character would use them in spite of conventions, and according to circumstances would either find an excuse, or he would boast, as Hagen did when his rival was dead and he had no one to fear, that he had treacherously stabbed Siegfried. Who is there to punish the strong except the stronger?

State Incongruities: Contraband of War.

Serious incongruities arise out of the presence of neutrals who may be in touch with the belligerents. Their alleged actions in support of one or the other side have frequently been the excuses for striking at them, and it is chiefly for their protection that conventions have been drawn up regarding contraband of war. Yet the opposition to such rules being made effective is very great, because the peaceful traders who would not hesitate to see their own country overrun with war, if individually they could make large profits out of contraband, are important factors to deal with. This is no doubt the main reason why it has never been suggested that money and loans should be declared contraband. Money and credit are the very sinews of war and are most easily cut off, but the powerful financial interests would not for an instant tolerate such an interference with their businesses. Yet it is by means of foreign loans, private and public, that contraband articles are paid for, and if money were to be declared contraband, regulations about ammunition and other goods would sink into insignificance. If a nation while at war could not ship money to neutral countries nor contract money loans there, and if promissory notes, issued during war time, were ruled out of court in neutral countries, then no merchants or manufacturers would risk sending goods to either belligerents, who would then have to rely on their own resources. Money is power, and those who supply it to either side or those who arrange credits and loans are not neutrals but are even more directly responsible for the continuation of war than those who supply arms and ammunition.

The international agreements about contraband articles are also thoroughly incongruous. Most neutrals permit certain articles to be declared contraband, but they refuse to allow them to be detained by legal pronouncements of their own law courts. All that they agree to is that con-

traband consigned to one side may be seized by the other side without redress to the neutral trader. This seizure is impossible to carry out in the case of land transport, so that contraband agreements only affect sea trade and differentiate in favour of continental traders and against English ones. To be consequential, but this would interfere with the peaceful money making trader, the aggrieved belligerent should have the legal power to prevent contraband from leaving neutral territory. At present all he can do is to engage spies who tell him on which ships certain articles are to be found. If he can do so he sends men-of-war after them, but sometimes, as in the South African war, he finds that his spies have been bribed and he has been hoaxed and is exposed to the danger of getting entangled with a powerful neutral. With a genuine convention, even contraband by rail could be entirely prevented if permission were granted to both belligerents to have their agents on the frontiers who could demand the return or destruction of each truck of contraband as it arrived.

There is the following incongruity connected with contraband declarations by the belligerents. Assume that A and B are at war, and that A declares that, say, cotton shall be contraband if shipped to B, but not to A. Then a merchant of a neutral state, N, who ships cotton to B, runs the risk of not only having his goods captured by A, but if N refuses to recognise A's declaration and insists on restitution of the goods or compensation there is risk of a new war. It would be much simpler and far more effective to adopt the principle that whatever A declares to be contraband if shipped to B, is certainly contraband if shipped to A, but that it is not contraband if shipped to B unless N agrees or unless B makes a similar declaration to A. This is merely an extension of the most favoured nation clause to peaceful traders. Combining this principle with the one of permitting belligerents to appeal to the neutral law courts, there would be every

likelihood that no European nation would ever dare to declare foodstuffs to be contraband, for their own resources are limited and with all their farmers fighting, their corn supply would soon cease.

It will thus be seen that war bristles with incongruities; to remove them would materially reduce the chance of war, but would that be in accordance with progress? War is the child of that human abstract reasoning power which shows that unity is strength, and by many people the fruits of reason are worshipped above everything else. Then too, war, being allied to necessity, is the mother of invention, and progress, as at present understood, would be seriously hampered by the absence of the incentive: War. Minerva was the goddess not only of the arts but also of war. The first implements were weapons, though doubtless these were merely stones and sticks; then followed clubs and stone spear and arrow heads. These are found in greater abundance and of greater antiquity than corn mortars, a civil invention. Pottery with which boiling, as distinguished from roasting, has been made possible is a comparatively recent invention. The taming of the horse and other transport animals was done to facilitate distant war operations. The plough was evolved much later and not before the horse had arrived. Chariots too were first used in war, and not for the peaceful transporting of goods. What other use could there have been in ancient days for bronze than for weapons? In fact, except for ornaments and bells, bronze, until quite recently, was used only for swords and guns. Was it not due to the cowardly practice of hiding in metal armour that the iron industry grew up in spite of the Dark Ages? The science of chemistry may be said to have started with the invention of gunpowder, and many modern chemists have spent years in the search of a smokeless powder, often finding other equally valuable compounds.

The peace-loving individual, admitting the above, will doubtless assert that industry is now so well established

that war has no improving influence on it. Let him pause! Let him remember that chronometers, the most perfect time measuring instruments, were not invented until the Admiralty offered a substantial reward for accurate clocks. Modern range-finders for guns probably surpass in delicacy and perfection any other known optical instruments, even those to be found in Observatories. Then too the first step taken by the inventor of the steamship was to tempt Napoleon to use it for the invasion of England, and nowadays flying machines are being constructed for no other purpose than for war. Motor cars, too, were at first thought to be more serviceable in war than the easily disabled horses.

State Incongruities: Communism.

State incongruities are, of course, vastly more numerous than those mentioned, and would appear innumerable if, as should have been done, the incongruities both of the smaller and of the larger states had been considered, as well as the incongruities arising out of the inter-actions of these large units on each other, but the subject cannot be further pursued. Enough has already been said to indicate—though this is not the object with which this or any previous chapter has been written—how difficult and slow it must always be to re-organise states without creating greater incongruities, and that possibly the most effective means which could be employed to this end, would be to give the individuals of states and sub-states, not dogmatic and classical education, but such teachings as will encourage them, and therefore the nation too, to think and to reason. This and some previous chapters may also perhaps give some faint indication of the impossibility of carrying out any of the various socialistic schemes, both imperial and democratic, of which every one in turn would, it is believed, result in a state without any incongruities. Amongst these, Communism, which,

however, now prefers to be called by the more general term "Socialism," figures largely, but even those who are its most passionate champions will, after glancing at only a few of the above incongruities, no doubt not only wish to remove them, but will also see that they are too many to be dealt with, and perhaps they may even feel that any attempt to graft Communism on state life would result in an incongruity in comparison with which, all the above sink into insignificance.

Communism, if it wishes to give all the advantages of civilisation without its disadvantages, can be carried out only by a relatively small community and on parasitical principles. The early Christians were, up to the reign of Constantine the Great, a relatively small communistic community in the vast Roman Empire, and have, to a certain extent, been copied by the semi-communistic Society of Friends and of Jews, who are parasitical in so far as that they avail themselves of all the benefits which the larger state can afford, without being true members of the state, which they accentuate by their refusal to fight on its behalf. If all Englishmen, from the days of the Stuarts, had been Quakers, Marlborough, Wolfe, Clive, Nelson and Wellington would have lived in vain. It is perfectly clear that we should not now be a nation, but a province like Burmah. For better or for worse, modern states have, during thousands of year, grown to be what they are in company with the fluctuating property idea, which sometimes did, and sometimes did not embrace land, movable property including women and ideas or inventions, and a structure has arisen called Civilisation. To replace this by Communism, according to which the property idea has to vanish entirely, while the advantages of civilisation are to be retained, is as impossible of succeeding as Charles V.'s attempt to make two pendulums of unequal length beat the same time. Communism is not so much a state incongruity as a state impossibility, for a communistic state is no state, it is merely the condition of

a savage or of a wild beast. Even a dog has a distinct feeling of ownership in the bone—movable property—at which he may be gnawing. Communism is possible amongst thieves because they ignore the very property idea which supplies them with the requisite of life; but it can never be carried out by the large state; this is only possible in a small community which avails itself of the benefits created by the larger state.

It is a far cry from the complicated subjects dealt with in these last chapters to the early ones about music, which lives its harmonious life in one dimension only, but that is simply due to their complexity and to their importance to us, and if, as here suggested, not only life, but ideas and inventions are manifestations of energy, and therefore subjected to natural laws, then the present analogy may be said to have been carried to a natural conclusion. At any rate it may be assumed that if a true understanding of the essence of music and an acquaintance with its laws and possibilities can lead towards perfect music, then a true understanding of Life, of the strivings of Energy, of the Laws of Nature, both simple and complex, of the physical forces and of the interactions of Ideas, should also lead to improvement. The more these manifestations of Energy are studied and understood, the easier will it be to grasp in what direction Energy is striving, and by following in the path thus indicated, to approach nearer and nearer to a life of perfection.

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